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A NOTE ON THE EDITORSHIP

The Publications committee extends sincere thanks to Dr. Doyal Nelson who has completed his term as Editor of AJER. We take this opportunity to acknowledge the significant contribution which he made to the continued development of AJER under the particularly challenging circumstances which have confronted scholarly publications in recent years.

With the publication of this issue we welcome Dr. Chester S. Bumbarger as the new Editor. Prior to joining the University of Alberta in 1967, Dr. Bumbarger was with the Bureau of Educational Research and Service at the University of Oregon. He holds M.Ed. and D.Ed. degrees from the University of Oregon. His professional background includes teaching and administrative experience at the school and university levels in Oregon, as well as a period of service in the State Department of Education.

Dr. Bumbarger's main teaching and research interests are in the areas of educational planning and organization theory. Included among his recent research involvements are studies of school finance and the evaluation of inmate education programs. He is currently Chairman of the Department of Educational Administration.

In addition to previous editorial experience as Editor of *The Canadian Administrator* and an Associate Editor of *Educational Administration Abstracts*, Dr. Bumbarger has served on the Editorial Board of *Challenge* and on the Research Review Panel for the journal of the Council of Educational Facility Planners.

The Publications Committee looks forward to working with Dr. Bumbarger. We wish him every success in his new responsibilities, and we hope that he will find them both professionally stimulating and rewarding.

E. Miklos, Chairman
Faculty Publications Committee

Editor's Message

The relevance of AJER to its readers depends in large part on manuscript assessments provided by specialists in the various fields of education. Such assessments are requested and provided with no compensation to those making the assessment. I wish to use this page to acknowledge assistance given to AJER this past year by the following:

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AKIRA KOBASIGAWA

University of Windsor

Children's Retrieval Skills for School Learning

Children from grades 4 and 8 were interviewed to assess their retrieval skills typically required for conducting research projects in school. One aspect of the study was concerned with children's skills in selecting search areas or specific sections of a book for a particular retrieval question by using relevant knowledge. Younger children had the relevant knowledge for the retrieval question but used that knowledge to define search areas only when highly directive instructions were given, whereas older children did so with fewer prompts. Another aspect of the study was concerned with children's disposition to evaluate gathered information against some criteria. Grade 4 children were less sensitive than grade 8 children to the need to evaluate collected information according to task demands, although many of them could be induced to think in this direction.

In the recent literature on cognitive development, there has been a growing interest in children's awareness of various reading-study techniques. Brown and Smiley (1977; 1978), for example, examined students' abilities to detect the essential elements of texts and their disposition to focus on such crucial units during study to improve subsequent recall. Myers and Paris (1978) investigated children's ideas about specific capabilities required for efficient reading, the nature of materials affecting reading processes, and strategies to overcome comprehension failures. More recently, Kobasigawa, Ransom and Holland (1980) observed children's strategic behaviors for locating specific pieces of information in prose passages. The findings reported by these investigators suggest that, during the elementary school years (grades 1 through 8), children become better aware of the existence of various study strategies and more sensitive to when and how to use them.

The present study was designed to explore further the development of study techniques with particular focus on retrieval strategies that are typically required for conducting research projects in elementary school. Assigning research projects to children of mid-elementary grade level (grade 4) has become one widely accepted method of teaching (e.g., Hooper & Dalton, 1973). Also, experts on reading-study techniques have emphasized the importance of retrieval skills in school learning (Thomas & Robinson, 1975; Thorn, Braun & Richmond, 1974). Since new

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information is being discovered and accumulated at an accelerating rate in today's world, a single classroom textbook can no longer be regarded as a sufficient and up-to-date source of information for most content areas (e.g., social studies). Students' success in school learning, therefore, is increasingly more dependent on their knowledge about where and how to locate new information efficiently (Thomas & Robinson, 1975). Consequently, the present study should provide useful data for our understanding of the development of "ecologically valid" study strategies in children.

The selection of specific aspects of retrieval processes for the present investigation was guided by previous conceptualizations of memory search (e.g., Flavell & Wellman, 1977; Kobasigawa, 1977; Shiffrin, 1970) and experts' opinion on study skills for elementary school children (e.g., Hooper & Dalton, 1973; Thorn, Braun & Richmond, 1974). On the basis of such models, we will briefly describe a framework of retrieval processes to clarify the focus of our research problem.

Retrieval processes begin when children generate or are given questions for their research projects and end when they formulate final answers to such questions (Kobasigawa, 1977; Shiffrin, 1970). With this definition, the retrieval processes may be divided into two interrelated subprocesses: (a) a search process, in which a person attempts to determine where the desired information is likely to be located and (b) an evaluation process, in which the suitability and sufficiency of gathered information for retrieval questions are determined.

With respect to the search process, imagine that one day children are learning various facts about China (e.g., China is the third largest country. Many people work on farms. China cannot produce enough food to feed its people.). At this point, students may be asked to do research projects to find out additional information about China (e.g., China: Farming in China. Climate in China). Children select research topics, locate several books on China, and determine if a particular book contains the sought-for information by consulting the table of contents and/or index as aids. The search process is relatively simple and straightforward if retrieval questions contain explicit "key words" that children should look for in the table of contents (e.g., "Find out about *farming*"). The search process, however, may become difficult when questions do not indicate explicitly what specific chapters or section of a book they should look for, for example, "Why cannot they produce enough food even though many people work on farms?" Based on the retrieval question, children may realize that answers may be found in a section of a book on "farming." Using their general knowledge that climatic conditions are important factors for farming, some of the children may additionally reason that a section on "climate" may contain answers to the question. To select search areas (chapters of a book), the second type of retrieval questions requires, as Flavell and Wellman (1977) have characterized a mature retriever, skills to integrate information given in a retrieval task, general knowledge, and reasoning. In the present study, we were interested in the development of such skills in children.

The information gathered through the search process may not automatically be included in a final report, but needs to be evaluated according to such criteria as relevancy and accuracy (e.g., Shiffrin, 1970; Thorn, Braun & Richmond, 1974). Even when students have collected several pieces of relevant-looking information, considering the task demand (e.g., I need the most recent information.), they need to decide which one of them best contributes to the solution of their problem.

With respect to the evaluation process, therefore, we assessed children's sensitivity to the need for evaluating the suitability of gathered information with regard to the purpose of the projects: Do I have enough relevant information? Do I have irrelevant information? Is this information up-to-date?

The specific purpose of the present investigation was, then, to provide developmental evidence for the acquisition of skills to select search areas and to evaluate gathered information. In addition, data concerning types of research questions children generate were also obtained. Towards this end, children of grades 4 and 8 were presented with a series of interview items. Grade 4 was selected as the youngest age group because children at that grade level begin independent research in school. The interview items included both relatively unstructured and structured forms of questions in order to describe a clearer picture of age-related differences in the use of retrieval skills. Also, to demonstrate the replicability of the present data, findings from our initial investigation (Kobasigawa & Barnett, 1981) will be provided.

Method

Subjects

Subjects were 20 grade 4 ($\bar{X}$ CA = 9.8 years) and 20 grade 8 ($\bar{X}$ CA = 13.8 years) children, balanced within each grade for sex. These children were drawn from a predominantly middle class parochial school located in the outskirts of Windsor, Ontario. Subjects for our preliminary study also consisted of 20 grade 4 and 20 grade 8 children with comparable chronological ages and were drawn from one parochial school in Windsor City, Ontario. According to their teachers' judgments, none of these children should have had difficulty in reading the materials used in this study. All of the participants had done research projects prior to participating in this study. Children were familiar with the card catalogue in the school library and the use of a table of contents and index for answering simple retrieval questions, for example, "Find out about spiders" (Hooper & Dalton, 1973, 99-100).¹

Materials

Six sets of interview items, each consisting of different numbers of questions, were prepared. These items were designed to assess children's skills to generate research questions, select search areas (chapters) in a particular book, and to evaluate the retrieved information regarding its suitability and accuracy. To facilitate communication of the findings, the interview questions and their intended foci will be described in detail in the Results section.

In addition to the interview items, the following materials were also prepared: (a) a map of Asia showing the location of China and a short prose passage about China (based on Butterfield's article, 1979) from which children were asked to generate research questions; (b) a sheet of paper on which a contents page of a particular book was shown; (c) a hand-written brief report in which two pieces of target information were missing while unrelated information was included; and (d) a world map indicating the distribution of certain animals and three "author cards" including call numbers of books, titles of the books, publishers' names, and dates of publication. Research topics included in the interview items were about "countries" and "animals." These topics were selected because, according to research coordinators of the school systems, they represented the most popular research topics for school children.

Procedure

The children were interviewed individually in a quiet room at their school. After briefly establishing rapport with the children, the interviewer explained that she would be asking questions about how children would go about doing their research projects at school. It was emphasized that the children were required simply to try "your best to say what you think." The interview items were presented in the same order (in the order as seen in Results) for all of the children. If children were unable to answer or clearly misunderstood a question, it was repeated or rephrased. Although children's verbal responses were tape-recorded, most of the responses were recorded on data sheets during the interview by the interviewer as the present tasks generally required simple answers from the children.

Scoring

Based on the intended focus of the questions and preliminary investigation of the verbal data, categories were generated to classify children's responses to each interview question. When children were allowed multiple responses, they could be credited with several categories. Using these categories, two judges independently scored the responses for each of the protocols. Interjudge reliability for each question was obtained by dividing the number of instances in which judges agreed on the use of the particular categories by the sum of agreements plus disagreements on the use of categories. Interjudge reliability scores for various questions ranged from 96% (classification of responses to "why" of Item 3-b) to 100% (Item 1, Item 2-c, Item 4). Disagreements that occurred in the scoring were reviewed and resolved by obtaining a consensus between the judges. Reliability was not assessed for those questions requiring Yes-No answers or simple choice responses for which agreement was obvious.

Results

Age differences within all response categories were analyzed by forming 2 (grades 4 vs. 8) $\times$ 2 (a particular response presence vs. absence) tables. Then Mainland and Murray's (1959) fourfold contingency tables were applied to the data. Mainland and Murray's tables substitute for direct computation of Yates' correction or Fisher's exact probabilities. For this reasons, only *p* values will be reported.

Generating Research Questions

The first interview item was prepared to determine what kinds of research topics or questions children generate by themselves. Of particular interest was whether or not children would suggest the kind of the retrieval question that we used for the second interview item (see Item 2).

1. "Let's pretend that one day in school you learned these things about China (the *E* gave a short prose passage to *S*). 'China is the third largest country in the world. Only Canada and Russia are bigger than China. Most of the people in China work on farms. But China cannot produce enough food to feed its people. Many people in China still are hungry.' Then the teacher tells you to do a research project about what you learned about China on that day. What kinds of topics or questions can you pick for your project from what you just learned?"

In general, the purpose of doing research projects is to clarify ambiguous information given in textbooks or to obtain related new information. As a result, children's research questions were classified into (a) a "known" category if answers to the questions were already given in the material (e.g., "What's the third largest country?") and (b) an "unknown" category if children's questions were to obtain new information. The unknown category was further divided into two types: a "single-fact seeking" type (e.g., "How big is China?" "What's the population of China?") and an "open-ended" type where questions were broad enough to write research projects or produced further questions (e.g., "Farming in China." "What do they bring to feed people? What are others doing to help them?" "How come they can't produce enough food?").

TABLE 1
VARIOUS TYPES OF RESEARCH QUESTIONS GENERATED BY CHILDREN

	Known	Unknown	
		Single Fact	Open Ended
Grade 4	5 (5)	4 (4)	1 (1)
Grade 8	2 (1)	3 (4)	15 (15)

Note. When children's responses included different types of questions, they were classified using the questions of higher levels. For example, children generating a single fact seeking and an open ended questions were classified into the open ended category. Figures in parentheses are based on the Kobasigawa and Barnett study (1981).

The findings are summarized in Table 1. One-half of the grade 4 ($N=10$) but all of the grade 8 children ($N=20$) generated at least one research topic or question. The remaining half of the grade 4 children repeated the reading material (e.g., "China is the third largest country."). A comparison across grades of the number of children who generated topics with those who did not yielded significant differences, $p<.01$. Significantly more of the grade 8 than the grade 4 children suggested the "unknown" type (5 vs. 18) or "open-ended" type (1 vs. 15) questions, $p<.05$. These age-related trends are comparable to those obtained in our preliminary study (Kobasigawa & Barnett, 1981), also summarized in Table 1 (figures in parentheses). As can be expected from these data, more of the grade 8 ($N=8$) than grade 4 ($N=1$) children spontaneously generated the retrieval question that we used for item 2 ("Why can't China produce enough food?").

Selecting Search Areas

Imagine now that children have selected their research topic and have located several books with titles that bear upon their problem. How will they proceed to check whether or not each book is likely to include the desired information? Assuming that a majority of children will say that they will use a table of contents and/or index, what specific topics or key words (i.e., search areas) do they look for in such book parts? To examine these questions, children were presented with Item 2.

2. "One child in the class, Jack,² said, 'I want to find out why China cannot produce enough food even when many people are working on farms.'³ (A card containing Jack's research question was given to the child.) Jack found several books on China. (a) How can he quickly find out what topics are in the first book? What parts of the book should he look in? (b) What (key) words should he look up in the index? What chapters should he look in to answer the question? (c) Can you make a guess why China cannot produce enough food?" Children were frequently reminded of Jack's research question.

For question *a*, 80% of the grade 4 and all of the grade 8 children said "index," "table of contents," or both. These findings were consistent with those observed in our preliminary study (Kobasigawa & Barnett, 1981). The remaining 20% of the grade 4 children said "I don't know," although they were aware where they could find the content pages and index in a book.

For question *b*, many of the grade 4 children (60%) initially said that they would look for the word "China" in the index. These children were reminded that the whole book was about China and asked to generate additional key words or topics. Forty percent of the grade 4 but all of the grade 8 children suggested at least one topic or key word. This age-related difference was statistically reliable, $p < .01$. Grade 4 children's topic words were restricted to "farming" and "food,"⁴ both of which appeared in the retrieval question. In contrast, about one-third of the grade 8 children indicated that they would also use such additional key words as "population," "climate," "weather," "soil," "land," and "industry." Apparently, some of the grade 8 students used their general knowledge (e.g., the rapid growth of population affects the sufficiency of food) to specify what sections of a book (population) other than "farming" might contain the target information. Although many children probably did not think about using their related knowledge to generate these "implicit" key words, they may be able to do so if they are prompted to think in this direction. To determine this possibility, question *c*, "Can you make a guess why China cannot produce enough food?" was asked.

None of the children indicated that they knew why people in China cannot produce enough food and, consequently, their responses to question *c* may be regarded as their hypothesis constructed during the interview. When children's hypotheses included any factor affecting the production of food, they were regarded "adequate" as long as they did not contradict information provided in the present task. For example, "maybe they don't have farmers" was not classified as "adequate" because the retrieval question states that "many people work on farms." Fifteen percent of the grade 4 and 60% of the grade 8 children generated at least one hypothesis, including "too many people in China," "the climate is not suitable for farming," "the condition of the land is not adequate for farming," and "they don't have good seeds." The observed age-related trend was statistically significant, $p < .05$.

Children's responses to questions *b* and *c* of Item 2 indicate that a considerable proportion of the grade 4 children does not use general knowledge to limit search areas. The younger children's relevant knowledge, however, may become more accessible for use to define search space if the situation is made more concrete by providing them with examples of possible search areas (i.e., a table of contents). In light of these considerations, the following questions were asked.

3. After reminding the children of Jack's topic, the interviewer said: "In the first book, Jack finds this page (the *E* showed *S* the contents page of the first book.). (a)

Do you think that this book is useful for Jack’s project? Why or why not? (b) Jack wants to use this book. Which chapter should Jack read first? Why? If Jack doesn’t have time to read the whole book, what are two more chapters that he should read for his project? Why?” The specific chapters appear in Table 2.

As to question *a*, 85% of the grade 4 and all of the grade 8 students affirmed the usefulness of the book for Jack’s project; 15% of the grade 4 children said “I don’t know.” Of those children who said the book would be useful, 16 of 17 grade 4 and all of the grade 8 children explained their decision by referring to at least one of the following four chapters: Farming, Land, Climate, and History. As one might expect, “Farming” was the most popular choice; 94% of the grade 4 and 85% of the grade 8 students selected this chapter. There were no significant age-related differences in children’s responses reported thus far. The older children, however, justified their decision that the book was useful by referring to a larger number of chapters ($\bar{X}$ =2.3, N =20) than did the younger children ($\bar{X}$ =1.2, N =17), $F(1,35) = 15.22$, $p<.001$. It appears that older children are more likely than younger children to consider “implicit” questions (e.g., Is the climate in China suitable for farming?) associated with the retrieval question and, consequently, recognize the relevance of more chapters. We found, though, that both younger and older groups responded in a similar manner when they were explicitly asked to choose three relevant chapters (question *b*).

TABLE 2
NUMBER OF CHILDREN SELECTING VARIOUS CHAPTERS
AS RELEVANT FOR ITEM 3-b

	Intro.	History	Land	Climate	Educ.	Cities	Farming	Arts	Sports
Grade 4	4	9	13	8	3	3	19	1	0
Grade 8	1	8	16	13	1	1	20	0	0
Grade 4	0	8	14	11	3	4	20	0	0
Grade 8	5	3	19	12	1	1	19	0	0

Note. Each child selected 3 chapters. The data summarized in the lower half of the table are based on the Kobasigawa and Barnett study (1981).

Children’s answers to question *b* are summarized in the upper half of Table 2. As can be seen in the table, most of the responses (88%) are restricted to the four chapters: Farming, Land, Climate, and History. Within each of these response categories, significant age-related differences were not observed. Once provided with an outline of the contents of a book, many of the grade 4 children were able to interpret the present retrieval question (i.e., they could figure out what search areas they should look for) in a manner comparable to the grade 8 children and thus selected similar “search areas,” although previously these children rarely generated this type of research question spontaneously (see item 1) or search areas other than

“farming” (see Item 2 *b* and *c*). Seventy-five percent of the grade 4 and 90% of the grade 8 children selected either “climate,” “land,” or both, and explained why the chapters they selected might contain possible answers to the research question (“Climate, if they don’t have the proper weather, nothing will grow.”). This finding suggests that the general knowledge that climatic conditions are important factors for farming is available even for many of the younger children, although that relevant information appears to become accessible for use only under the highly structured task situation. Children’s responses to question *b* of Item 3 summarized here are consistent with those obtained in our preliminary study (Kobasigawa & Barnett, 1981). The data for the previous study are presented in the lower half of Table 2.

Evaluating Gathered Information

With Items 4 and 5, we investigated whether or not children would show awareness that the suitability of collected information needs to be evaluated against retrieval questions (Do I have enough relevant information? Do I have unrelated information?).

4. “Jenny was told by her teacher to find answers for these three questions using an encyclopedia. (The *E* gave *S* a card containing the three questions.) A. Where do black bears live? B. How heavy are they? C. How fast can they run? Jenny thinks that she has finished her report and shows it to you. (The *E* gave Jenny’s report to *S*.) Does the report look OK? Why or why not?” Jenny’s report began by stating its purposes to answer three questions, continued with an answer to question A, a very general statement regarding question B (“Black bears are the smallest bears of North America.”), but did not have any information for question C. It also included three sentences unrelated to the questions (e.g., “They like sweet things.”).

TABLE 3
NUMBER OF CHILDREN SHOWING VARIOUS RESPONSES TO ITEM 4

Acceptable		Unacceptable		
		Relevant Information Missing	Delete Irrelevant Information	Other Reasons
Grade 4	12	5 (3)	0	3
Grade 8	3	16 (14)	1	0
Grade 4	12	8 (4)	0	0
Grade 8	2	17 (15)	3	0

Note. A child can be classified into both "relevant information missing" and "delete irrelevant information" categories. For example, "He did not answer questions B and C. I don't think he needs these sentences (irrelevant information)." The figures in parentheses represent the number of children who said answers for both questions B and C were missing. The data summarized in the lower half of the table are based on the Kobasigawa and Barnett (1981) study.

Children's responses are summarized in the upper half of Table 3. The trend for the younger children to say "Yes, the report looks fine" (60%) and for the older children to say "No" (85%) was statistically reliable, $p < .01$. "Everything is true" and "There is nothing wrong with the spelling" were two major reasons given by the children for accepting the report. Significantly more of the grade 8 (80%) than the grade 4 (25%) children specifically indicated that at least one piece of relevant information was missing, $p < .01$. As is shown in Table 3, most of the children were more concerned with the missing information than with the irrelevant information; even the older students rarely mentioned the need to delete the unrelated sentences. These findings replicated what we observed in the Kobasigawa and Barnett study. The results of the latter study are summarized in the lower half of Table 3. In the next set of questions, we explicitly indicated to the children that Jenny's report was unsatisfactory to assess the lower limits of the children's awareness of criteria to evaluate the gathered information.

5. "The teacher is unhappy with the report and tells Jenny to work on it some more. (a) Is there any more information that Jenny should put into her report? (b) Is there any information that Jenny should take out of her report? (c) In Jenny's report, do you find an answer for question A? Do you find an answer for question B? Question C?"

With question *a*, the age-related difference observed for Item 4 was reduced slightly, but continued to be significant, $p < .05$; 45% of the grade 4 and 90% of the grade 8 children said that relevant information for question B or C was missing in Jenny's report. While this finding suggests that many of the grade 4 children are not sensitive to the need to evaluate the collected information against the retrieval questions, the generalizability of this conclusion may be limited. Kobasigawa and Barnett (1981) reported that, when question *a* was given, 70% of the grade 4 students indicated that Jenny's report did not contain information for question B or C. With question B, there were more children who indicated that unrelated information should be excluded from the report than when given Item 4; 35% of the grade 4 and 75% of the grade 8 children pointed out at least one unrelated sentence included in the report, $p < .05$. In the Kobasigawa and Barnett study, 50% of the grade 4 and 60% of the grade 8 students identified at least one unrelated sentence. Finally, with question *c*, practically all of the children, just as was found in our preliminary study, realized that Jenny's report did not include answers for question B and C. This final finding suggests that grade 4 children have the ability to recognize what constitute appropriate answers to the present retrieval questions, although they frequently do not use that ability to evaluate the gathered information (Item 4; Item 5 *a*).

6. Item 6 was prepared to assess children's awareness of the importance of checking whether or not located information is up-to-date. "Neal and his friends are doing a project on where wolves live today. They have learned that *wolves are disappearing from different parts of the world* (the italicized part was emphasized). They want to make a map showing where wolves live today. (The *E* showed the *S* a map illustrating the distribution of certain animals.) When they looked at the card catalogue of the library, they found three books, each book with a map showing where wolves live. (The *E* gave *S* three author cards and read the author's name, the title of the book, and its publication date written on each card). (a) If they can choose only one book, which book should they pick for their project? Why? (b) Is it important to check when the book was published?"

Children's responses to "why?" (question *a*) indicated that 70% of the grade 4 and 50% of the grade 8 children selected material using only the title of the book as criterion ("This book would be the best 'cause it says 'Where are wolves?' " "This one would be OK 'cause it says 'The kingdom of wolves' "). The remaining children said that they should choose the book with the most recent publication date. This observed age-related difference was not statistically reliable. When children were further asked whether or not they should have thought about the publication date for the selection of information source (question *b*), 60% of the grade 4 and 95% of the grade 8 children recognized the importance of the "up-to-date" criterion (e.g., "I didn't think of the date. Many wolves could be extinct and there could be new information on where they live now."). A comparison of "title" with "up-to-date information" categories yielded significant age differences, $p < .05$. A similar age-related trend was observed in the Kobasigawa and Barnett study; 95% of the grade 4 and 40% of the grade 8 children did not use the "recency" criterion for selecting the information source (question *a*).

Discussion

One aspect of the present study was concerned with children's skills in selecting search areas by using information given in a retrieval question and their related knowledge. When asked explicitly to choose the three most relevant chapters for the present retrieval question (Why can't China produce enough food?), younger students responded similarly to older students, selecting such chapters as Farming, Climate, and Land (Item 3-b). Furthermore, grade 4 children frequently explained why those chapters selected might contain possible answers to the retrieval question. Grade 8 students, however, were able to narrow the search area with fewer directive instructions than did grade 4 students. These findings suggest that many younger children have the relevant knowledge for the present retrieval question but use that knowledge to define search areas only under highly structured situations, whereas older children can use that knowledge more widely.

Several speculations can be made with regard to the age-related differences just noted. Firstly, although not all of the grade 8 students were mature retrievers (i.e., they needed a few prompts to generate search areas), more of the older than younger children are planful to devise strategies to limit search space. One step in the process of restricting the search space for the present retrieval question is to search for related knowledge: Have I seen or studied analogous problems? What were factors affecting the sufficient production of food in those problems? Are such factors applicable to the present retrieval problem? etc. (e.g., Collins, 1977; Wessels, 1982). One of the grade 8 students spontaneously illustrated such thinking processes: "I don't know about China. But I learned that people in India had the same problem. Maybe there are too many people in China." Secondly, while both younger and older children may know that certain factors affect effective farming, that knowledge may change with age; older children's knowledge may become more elaborate as it is integrated with additional pieces of information or specific instances and, consequently, it may become readily accessible under wider situations (Flavell, 1977). Thirdly, there is evidence from teachers' curriculum guide books (e.g., Hooper & Dalton, 1973) and from our informal interview with teachers, that teachers are likely to assign well-defined research questions to younger children (e.g., "Find out about spiders."). When retrieval questions are simple, soliciting a few pieces of factual information, there is no need

to subject these questions to further analyses to facilitate the search process. In contrast, it is reasonable to assume that older children receive relatively more complex research topics that require identifying specific components. Presumably, any combination of these factors (older children's planfulness, their elaborate and accessible knowledge, and increased experiences with ill-defined problems) facilitates older children's spontaneity for reducing search space observed in this study.

A few comments will be made on children's skills to use book parts. According to standardized tests on study skills (e.g., King, 1968), knowledge about the use of book parts is expected to be achieved by the grade 4 level. Standardized test items generally contain explicit key words that are highly salient targets for search in a table of contents or index. (e.g., "Do we find a botanical garden in San Francisco?" "Chapter 3: Where botanical gardens are.") In contrast to such items, the present retrieval problem required children to generate what might constitute key words (climate, land) when selecting appropriate chapters. The results of this study (Item 2-a; Table 2) suggest, then, that many children, by the time they finish grade 4, can learn when and how to use book parts efficiently as guides to locate information beyond the level generally required by standardized tests. Beyond the grade 8 level, as some of the grade 8 students demonstrated, children's use of the table of contents may become much more systematic in the order they select chapters: First, you should find out what they are trying to grow (chapter on farming). Then you check if the soil is suitable for what they are trying to grow (chapter on land). If the soil is dry, you check if the climate is dry (chapter on climate).

The second aspect of the present study dealt with children's awareness of criteria by which to evaluate collected materials. In one related item, the majority of the grade 4 children selected a reference book without checking its recency of publication, although the research question obviously implied that the up-to-date information was required (Item 6). When they were asked to evaluate a hypothetical report containing incomplete answers to retrieval questions, more grade 4 than grade 8 children failed to recognize that the report lacked sufficient relevant information (Item 4). Younger children's tendency to overlook incomplete answers may be attributable to two reasons. First, to decide whether or not a report (or a piece of reference material) contains the requested information, children must continuously attend to several specific purposes of the essay while simultaneously reading its contents. Perhaps this is a difficult cognitive operation for some of the younger children to carry out spontaneously, although they exhibit such skills when assisted by an adult in considering each purpose separately ("Do you find an answer for question A?" Item 5c). Alternatively or additionally, younger children may have a different or a more dominant criterion for evaluating gathered information than that necessitated by the retrieval questions. For them, as was indicated by some of them, to evaluate a report means to check mainly whether or not each piece of retrieved information is empirically true or if an essay is neatly written (similar results are reported by Markman, 1979). For either case, the present findings (Items 4, 5 and 6) suggest that younger children are less sensitive than older children to the need to evaluate collected information and reference materials according to task demands.

Previous researchers (Thomas & Robinson, 1975) have reported that children frequently waste their time by presenting task irrelevant information in their

reports. Interestingly, this observation appears to apply not only to grade 4 but also to grade 8 students in this study (see Table 3). Of course, this finding could partly be due to the fact that children were not instructed to point out exhaustively the inadequacy of the gathered information. Having considered that the identification of a few pieces of missing information would be sufficient for the present task demand, some of the older children might have simply terminated a search for additional problems involved in the report.⁵ Approximately 30% of the older children, however, still did not mention the presence of irrelevant information in the report even when it was hinted they think in this manner (Item 5 question b). Informal evidence obtained from verbal reports of several children suggests that this observed tendency to "include all" may not always reflect their inability to detect irrelevancy of information but the use of a different criterion that "you'll get a better mark if you write more."

In summary, both the present and our preliminary studies provided evidence that, during the upper-level of elementary school years, children become increasingly more skillful at such aspects of the retrieval process as generating and defining search areas and evaluating gathered information and its sources. It has been suggested that children's sensitivity to the need to use such strategies depends to a great extent on the complexity of the retrieval problems, the difficulty level of the reading materials, and the nature of the task demands (e.g., Brown & Smiley, 1978; Kobasigawa et al., 1980). Accordingly, we may question just what kinds of retrieval tasks are required for younger children to become aware of the importance of thinking about related knowledge to specify search space. How well can older children narrow down research topics if such topics exceed the complexity of those used in the present study? We asked the children in this study to solve hypothetical research problems; yet, to what extent do children spontaneously think about and use retrieval strategies assessed here while they actually undertake research projects at school? Future studies to resolve these and other related issues would seem a worthwhile research endeavour.

Notes

1. Hooper and Dalton's Teacher's guidebook is used by the teachers of the schools where the present and preliminary studies were conducted.
2. A female name was used for girls. This note applies to the remaining items.
3. This retrieval question was suggested by Wiens (1966).
4. As comparable key words to "farming" and "food," a few grade 8 students suggested "agricultural products" and "crops."
5. This point was suggested by one of the reviewers.

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Orientation to School and Transitions of Children Between Primary Grades

The perceptions and opinions of Kindergarten, Grade 1, Grade 3, and Grade 4 teachers, principals, and a stratified random sample of parents about children's orientation to Kindergarten and their transition from Kindergarten to Grade 1 and Grade 3 to Grade 4 were examined using questionnaires. Results are reported on initial adjustment to school, orientation programs, difficulty of children making transitions, reasons for difficulty, use of and reasons for K-1 transition classes, use of shortened days in September, and need for increased teacher communication. Recommendations made to the school board are reported.

And the first step, as you know, is always what matters most, particularly when we are dealing with those who are young and tender. That is the time when they are easily moulded and when any impression we choose to make leaves a permanent mark.

Plato, *The Republic*, 337

In many cultures and times, the beginning has been considered a most critical point of an endeavor. For the young child, one of the most important experiences is the beginning of public school. Kindergarten is the initial exposure of most children to public education and thus plays a part in the establishment of life-long attitudes towards school and education.

Kindergarten may be either a beginning or a continuation. For many children, Kindergarten is the next educational step after nursery school or day care. For other children, it is truly a beginning in which the child must make the transition from home to school. A central topic of this study is this transition from day care/nursery school or home to Kindergarten. It is important to discover how, as well as how successfully, children's initial orientation to public education is facilitated.

Ideally, Kindergarten should be part of the educational continuum that spans primary, intermediate and the upper grades. For most children, the transition from Kindergarten to Grade 1 involves adjustment to a longer day and a more formalized curriculum in a more structured day than children experienced in

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Kindergarten. The question arises as to whether or not this transition causes difficulties for some children; if this seems to be a problem, what are some probable causes and what may be some possible solutions?

The next major transition in the school life of primary level children is the transition from Grade 3 at the end of the primary program into Grade 4 at the beginning of the intermediate program. Again, the question has been raised as to whether or not this transition causes difficulties for some children.

This study was initiated by the Commission on Education for the Board of School Trustees of Greater Victoria District to investigate Kindergarten children's orientation to school and their transition from Kindergarten to Grade 1 and the later transition from Grade 3 to Grade 4 as perceived by teachers, administrators and parents.

Method

In the study questionnaires to teachers, principals and parents were utilized as the primary strategy for obtaining information. Interviews of School District personnel were used to obtain other specific information.

Subjects

The Kindergarten questionnaire was sent to the entire population of Kindergarten teachers in School District #61. Similarly all Grade 1 teachers, Grade 3 teachers, Grade 4 teachers, and elementary principals received a questionnaire relevant to their particular level. Teachers of split grades (e.g., Grade 1/Grade 2) were not included unless the only class at that grade level in a school was a split grade. The teacher of such a class was included as it was judged important that every school be represented at each of the four grade levels used in the survey. Schools with highly specialized programs (e.g., hospital-based) or special organization (e.g., nongraded) were not included because of their atypical nature.

A stratified random sample was used for parents of children currently enrolled in Kindergarten, Grade 1, and Grade 4. The school district was divided into quadrants equalized by elementary school enrolment. Three schools were randomly selected from each quadrant. All parents of Kindergarten, Grade 1, and Grade 4 children in these schools received questionnaires specific to their child's grade level.

The total number of subjects in each group surveyed and the return rates for the questionnaires are summarized in Table 1.

Procedure

Separate questionnaires using five-point Likert scale, yes/no, and completion formats were developed for each of the following groups: Kindergarten teachers, Grade 1 teachers, Grade 3 teachers, Grade 4 teachers, principals, parents of Kindergarten children, parents of Grade 1 children, parents of Grade 4 children. Items for these questionnaires were drawn from a variety of sources including a previous district Kindergarten questionnaire, recent Gallup polls, *Language B.C.* (1976), current curriculum guides, interviews with district personnel, recent research and professional literature.

As a result of a pilot study, the questionnaires were revised and the final forms of the questionnaires were mailed. A cover letter invited respondents to telephone

the researcher if they had any questions or additional concerns; several people did so.

TABLE 1
RATES OF RETURN ON QUESTIONNAIRES

Group	Number Questionnaires Sent	Number Questionnaires Returned	Rate of Return
Kindergarten Teachers	44	39	89%
Grade 1 Teachers	51	47	92%
Grade 3 Teachers	52	49	94%
Grade 4 Teachers	54	51	94%
Principals	36	36	100%
Parents of Kindergarten Children	96	53	55%
Parents of Grade 1 Children	96	71	74%
Parents of Grade 4 Children	96	54	56%

Results and Discussion

The results are reported in the following order: (1) initial adjustment to Kindergarten, (2) transition from Kindergarten to Grade 1, and (3) transition from Grade 3 to Grade 4.

Initial Adjustment to Kindergarten

The first step in examining the initial adjustment of children to Kindergarten was to ascertain the views of Kindergarten teachers, principals, and parents of Kindergarten children as to the importance of this transition into school. These groups indicated a high percentage of agreement with the statement “The transition into Kindergarten is very important in setting the tone and determining how a child will feel about school” (adapted from Weinberger, 1976). (See Table 2.) Among Kindergarten teachers, 90% strongly agreed with the statement. There was general overall agreement among principals and parents of Kindergarten children. No parent disagreed with the statement while there was slight disagreement by principals and Kindergarten teachers.

In response to the question “Do you think some children have difficulty adapting to Kindergarten?”, 92% of the Kindergarten teachers and 94% of the principals marked “Yes” while 8% and 6%, respectively, marked “No.” Those who had responded affirmatively were asked to indicate the percentage of girls and the percentage of boys who typically have difficulty adjusting to Kindergarten. Both principals and Kindergarten teachers thought that a higher percentage of boys ($M_o=8-10\%$) had difficulty adapting to Kindergarten than did girls ($M_o<5\%$). Neither thought a majority of girls had difficulty while 17% of the Kindergarten teachers and 22% of the principals indicated a majority of boys had difficulty adapting to Kindergarten. This result seems consistent with the general pattern of boys having more difficulty throughout school than girls.

TABLE 2
RESPONSES OF TEACHERS, PARENTS, AND PRINCIPALS TO STATEMENTS
ON CHILDREN'S INITIAL ADJUSTMENT TO KINDERGARTEN

	Strongly agree	Agree	Neutral -- Don't know	Disagree	Strongly Disagree
The transition into Kindergarten is very important in setting the tone and determining how a child will feel about school.					
Kindergarten teachers (n=39)	90%	-	-	10%	-
Principals (n=36)	53%	44%	-	3%	-
Kindergarten parents (n=47)	64%	34%	2%	-	-
Each elementary school in each community could plan and implement an educational program for parents who have young children about to enter Kindergarten or already enrolled in Kindergarten.					
Kindergarten teachers (n=38)	39%	45%	5%	11%	-
Principals (n=35)	23%	60%	6%	11%	-
Kindergarten parents (n=46)	37%	45%	9%	9%	-
The Kindergarten day in September should be shortened and then gradually extended during the first few weeks.					
Kindergarten teachers (n=39)	61%	26%	5%	8%	-
Principals (n=34)	29%	44%	6%	21%	-
Kindergarten parents (n=46)	19%	33%	2%	39%	7%

The parents of Kindergarten children were asked, "Did your child have difficulty adjusting to Kindergarten?" Of the 47 parents responding to this question, 17% said their child had difficulties. The reasons for this difficulty as given by six of these eight parents were: length of the Kindergarten day and the child's short attention span, shyness, language problem, learning problems and move into a new neighbourhood. These parents did not mention a late (i.e., October-December) birthday as being a factor although this is a frequently mentioned reason in the popular press.

Several parents who thought their child did not have difficulty adjusting to Kindergarten wrote comments indicating that this was due primarily to their child's previous attendance in a preschool program. As a result of these comments, a subsequent analysis was done. Of the 47 parents of Kindergarten children, 83% had enrolled at least one of their children in a preschool program. This result reflects the predicted national trend of more children attending a preschool

program due, at least in part, to the increasing number of working mothers with preschool aged children (National Day Care Information Centre, 1979). The previous preschool attendance of children has implications for both orientation to Kindergarten and the current curriculum.

The *Resource Book for Kindergartens* (1973) gave "some practical suggestions for the orientation of both children and parents to kindergarten" (p. 78). These suggestions were: (a) meeting parents during spring registration, (b) calling informal group meetings with parents in the spring to explain the program and answer questions, (c) arranging visits by parents and children to Kindergarten classroom, (d) doing home visits and using other methods of becoming acquainted with family backgrounds, (e) arranging for printed information to be sent to parents, sending a welcome letter to each child, and (f) asking one or two parents to assist in "the initial mechanics of the school opening" (p. 78). It should be noted that not all of these suggestions may be advantageous or even practical for all teachers in all situations.

Ninety-two percent of the Kindergarten teachers who returned the questionnaire ($N=39$) indicated that they and/or the school did some type of orientation work with children and/or parents in preparation for beginning Kindergarten. The most frequently reported type of orientation was an invited visit of children to the Kindergarten during the spring prior to their registration. The next most frequently reported type of orientation was interviews/visit in early September for the purpose of familiarization with the Kindergarten program, classroom, and teacher.

The least frequently reported type of orientation were home visits, distribution of parent handbook, and visits by Kindergarten teacher to neighbourhood day care centres and return visits by children to Kindergarten classroom. Only one teacher reported no contact with parents or children in preparation for beginning Kindergarten. This infrequent use of home visits and visits to day care centres may be due to a lack of the release time necessary for this type of activity.

A recommendation resulting from a comprehensive review of the research related to children's entrance age into first grade (Hedges, 1977) was that "each elementary school in each community could plan and implement an educational program for parents who have young children about to enter Kindergarten or already enrolled in Kindergarten" (p. 151). (See Table 1.) The high percentage of agreement among Kindergarten teachers, principals and Kindergarten parents indicated a common viewpoint. In practice, it appears that any program to explain Kindergarten is at the discretion of and implementation by the Kindergarten teacher. Thus the Kindergarten teacher seems to have the responsibility for establishing early parent-school contacts.

Parents of Kindergarten children were also asked if they thought the school could have helped them in any way in preparing their child for school. This question originated from a Gallup poll (1979) which found most parents with children already in school responded negatively while most parents whose children were not yet in school responded affirmatively. In this study, as in the Gallup poll, the majority (62%) of the parents of Kindergarten children responded negatively. A follow-up question asked those (38%) who had responded affirmatively to suggest ways this could have been done. The most frequent suggestions were:

1. Provide more information about the program
2. Arrange more time for parents to talk to the teacher

3. Permit child to visit Kindergarten more than once before September
4. Arrange for child to visit once
5. Arrange for parent to visit.

These suggestions are also similar to the results of the Gallup poll. The recurring theme seems to be the need by parents for more access to information sources.

In discussing the schedule for beginning Kindergarten, the *Resource Book for Kindergartens* (1973) suggests that "shortened sessions initially are advantageous . . . [and] that not until sometime during the second week should a full two and one-half hour session be considered" (p. 79). The responses of Kindergarten teachers, principals, and parents of Kindergarten children to the statement: "The Kindergarten day in September should be shortened and then gradually extended during the first few weeks" were almost equally divided between agreement and disagreement for the Kindergarten parents, while both the Kindergarten teachers and principals expressed more agreement (see Table 2). A possible explanation for some parents' dislike of shortened days was indicated in additional comments made by some parents stating that their children had been enrolled in a preschool or day care program and therefore were accustomed to longer days. This system of shortened sessions can pose problems for working mothers who must arrange for additional care during this time. As a system of shortened days has been valued and accepted by various educational writers and groups (Morgan, Hofstra, Black & Skinner, 1979), there may exist a need to explain more fully to parents why the system is used and what the benefits are for the children.

To determine to what extent and which patterns of shortened sessions were actually being implemented, Kindergarten teachers were asked if their Kindergarten sessions in September were shortened. Fifty-nine percent responded affirmatively and 66% of these teachers used shortened days for a period of three weeks or more. Approximately one-fifth (21%) used a shortened day schedule for one to two weeks.

In summary, Kindergarten teachers, principals, and parents agreed that the transition into Kindergarten was very important in setting the tone and determining how a child will feel about school. Boys were judged to be more likely to have difficulty adjusting to Kindergarten than girls. Nearly all Kindergarten teachers did some type of orientation work with parents and/or children, most frequently a visit of the children to the Kindergarten during the Spring prior to their registration. There was strong support among Kindergarten teachers, principals and parents of Kindergarten children for a program to explain the Kindergarten program to parents.

Transition from Kindergarten to Grade 1

A second purpose of this study was to determine if children had difficulty making the transition from Kindergarten to Grade 1. Kindergarten teachers, Grade 1 teachers, and principals were asked "Do you think some children have difficulty making the transition to Grade 1?" The parents of Grade 1 children were asked "Did your child have difficulty making the transition from Kindergarten to Grade 1?" The Kindergarten teachers, Grade 1 teachers, and principals were then asked to give the approximate percentage of boys and girls who had difficulty making the transition from Kindergarten to Grade 1.

Ninety percent of the Kindergarten teachers, 92% of the Grade 1 teachers and 86% of the principals indicated that they perceived that some children had

difficulty making the transition from Kindergarten to Grade 1. Of the Grade 1 parents who responded, 28% said their child had difficulty making this transition. This is a higher percentage (28% vs. 17%) of parents than those who indicated their child had trouble adjusting initially to Kindergarten.

The percentage of boys and girls who reportedly had difficulty making the transition from Kindergarten to Grade 1 ranged from zero to over 95%. The most frequently given percentages for girls having difficulty were in the range of 5-10% for teachers and principals. The same is true for boys. These ranges are similar to those given for Kindergarten boys but higher than those for Kindergarten girls. However, a very different pattern emerged for the second most frequent range of percentages. For girls, the second most frequently reported range was under 5%; for boys it was over 50% (no one indicated that more than 50% of the girls had difficulty). The pattern of responses among the Kindergarten teachers, and Grade 1 teachers and principals showed a high degree of agreement. This pattern is similar to that found by Conway (1968) who studied School Districts 39 (Vancouver) and 61 (Greater Victoria) and found that, in the opinion of primary teachers, the "well-adapted pupils" were usually girls and the "poorly-adapted pupils" were usually boys (p. 27). This pattern also holds for the transition between Grades 3 and 4 discussed later.

Once it had been determined that some children are perceived to have difficulty making the transition from Kindergarten to Grade 1, Kindergarten teachers, Grade 1 teachers, and principals were asked why they thought some children had difficulty making this transition. The parents of Grade 1 children who stated that their child had difficulty were asked what they thought was the reason for this difficulty. Among these groups, there is no consensus but rather three distinct "areas" of difficulty. Nearly half the Grade 1 teachers (48%) and Kindergarten teachers (43%) thought the reason for this difficulty was "Immaturity" often as a result of late (i.e., October-December) birthdays. None of the parents and only 4 1/2% of the principals suggested late birthdays/immaturity as the reason. The pattern of principals' responses was an equal split (32%) between "Health Reasons" and "General Readiness." The third area of difficulty was given by 50% of the parents ($N=22$) who reported that their child had difficulty making the K-1 transition because of the increase of expectations for children in Grade 1. The increased structure of Grade 1 and its curriculum was the reason given by 27% of the Kindergarten teachers and 17% of the Grade 1 teachers.

Perhaps one of the most important factors in dealing with any difficulties children may have because of the increase in expectations is the communication and understanding among all groups concerned as to what these expectations are. Kindergarten teachers, Grade 1 teachers, and principals were asked to respond to the statement: "There should be more coordination of Kindergarten and primary grade programs to promote understanding by all teachers of the expectations upon time as well as a more effective transition for children from one level to another" (recommended in *Language B.C.*, 1976, Vol. 1, p. 29). (see Table 3.)

There was a relatively high percentage of agreement between Kindergarten teachers and Grade 1 teachers on the need for more coordination. There was a lesser degree of agreement among principals as well as the highest percentage of disagreement as to the need for more coordination for the purpose of promoting more understanding of the expectations. A similar, though less strong, pattern of response was seen in the answers to a more general statement that "There is a need

for increased communication between Kindergarten and Grade 1 teachers” (see Table 3).

TABLE 3
RESPONSES TO TEACHERS, PARENTS, AND PRINCIPALS TO STATEMENTS
ON CHILDREN TRANSITION FROM KINDERGARTEN TO GRADE 1

	Strongly agree	Agree	Neutral -- Don't know	Disagree	Strongly Disagree
There should be more coordination of kindergarten and primary grade programs to promote understanding by all teachers of the expectations upon them as well as a more effective transition for children from one level to another.					
Kindergarten teachers (n=39)	49%	36%	7.5%	7.5%	-
Grade 1 teachers (n=47)	40%	38%	11%	7%	4%
Principals (n=36)	22%	44%	11%	20%	3%
There is a need for increased communication between Kindergarten and Grade 1 teachers.					
Kindergarten teachers (n=39)	38.5%	38.5%	5%	18%	-
Grade 1 teachers (n=46)	32.5%	32.5%	11%	20%	4%
Principals (n=36)	11%	45%	8%	33%	3%
There is a need to make provision for "mature" or "bright" children for whom less than a full year of Kindergarten is sufficient.					
Kindergarten teachers (n=39)	23%	33%	13%	28%	3%
Grade 1 teachers (n=44)	23%	30%	20%	23%	4%
Principals (n=35)	20%	57%	11%	9%	3%
Kindergarten parents (n=47)	28%	32%	15%	21%	4%
Grade 1 parents (n=68)	28%	40%	10%	16%	6%

The group which was most concerned with the difficulties of children in the K-1 transition caused by the increase of expectations was the parents of Grade 1 children. Half of the parents whose children had difficulty with the K-1 transition gave this as the reason. Other parents whose children did not have any difficulty wrote comments that indicated a desire for information about what was expected of their child and what the child would be doing during the year. These parents stated that they did not feel they knew enough about the expectations for their

individual children nor how or if they could help their child to be more successful in meeting these expectations. Throughout this study, recurring supplementary comments by parents indicated that they wanted to know more about (a) what their child was doing, (b) how well their child was doing, and (c) what they could do to help their child.

A Kindergarten - Grade 1 transition class is seen traditionally as an opportunity for those children who have completed Kindergarten and are not ready for Grade 1 to experience a program that is more advanced than the Kindergarten program but not as advanced as Grade 1. When Kindergarten teachers, Grade 1 teachers, and principals were asked to state the advantages and the disadvantages of Kindergarten - Grade 1 transition classes, all three groups most frequently reported "giving children more time to mature" as the foremost advantage followed by "giving children more time to master specific skills." The third most frequent advantage given by principals and Grade 1 teachers was that "a transition class permits more individualized teaching." The third advantage given by the Kindergarten teachers was "the prevention of the development of a pattern of failure." The most frequent response of all three groups as to the disadvantages of a Kindergarten - Grade 1 transition class was that there was no disadvantage. The administrative and organizational difficulties of such a possibly small class (e.g., bussing) was the second most frequently given disadvantage.

For children who were judged not to be ready for Grade 1, the options were either placement in a K-1 transition class (if one is available) or retention. In order to determine the degree of use of these options, Kindergarten teachers (who had been teaching Kindergarten in this District the previous year) were asked what percentage of children were retained in Kindergarten or placed in a K-1 transition class. Of the 11 Kindergarten teachers who stated that children were retained, four retained 1% of the class, four retained 5%, and three retained 10%. Of the five teachers who stated that children were placed in a K-1 transition class, two teachers reported 10%, three other teachers reported 20%, 80%, and 100% respectively placed in a transition class. The fact that only five teachers placed children in transition classes was probably more a reflection of the unavailability of such classes rather than a limited need for transition classes. Several teachers wrote that placement in a transition class was not an available option at their school.

The other side of the issue of retention is the issue of acceleration and enrichment for children who are "bright" enough and "mature" enough to need more than is provided in the regular Kindergarten program. If such children are to be challenged to the limit of their abilities, special provisions within the classroom or in a special class may need to be made.

Kindergarten teachers, Grade 1 teachers, principals, parents of Kindergarten and Grade 1 children were asked to respond to the following statement which is based on one of the recommendations in *Language B.C.* (1976): "There is a need to make provision for 'mature' or 'bright' children for whom less than a full year of Kindergarten is sufficient" (p. 63). Slightly more than half of the Grade 1 and Kindergarten teachers agreed with this statement (see Table 3). The parents of Kindergarten and Grade 1 children expressed a high percentage of agreement. Both the highest percentage of agreement and lowest percentage of disagreement were expressed by the principals.

In summary, a high percentage of Kindergarten and Grade 1 teachers and principals indicated that some children (usually boys) have difficulty making the

transition from Kindergarten to Grade 1. Of the Grade 1 parents, one-quarter thought their child had difficulty. The most frequently given reasons for difficulty were (a) immaturity, (b) health reasons and general readiness factors, and (c) increase of expectations for children in Grade 1. Teachers and principals favoured K-1 transition classes for children who need more time to mature as well as for children for whom less than a year of Kindergarten would be sufficient. Teachers and principals agreed that there was a need for more coordination of Kindergarten and primary grade programs and more communication between Kindergarten and Grade 1 teachers.

Transition from Grade 3 to Grade 4

Another purpose of this study was to try to determine if teachers, parents, and principals perceived the transition from Grade 3 to Grade 4 to be difficult for children. The parents of Grade 4 children were asked "Did your child have difficulty making the transition from Grade 3 to Grade 4?" Grade 3 teachers, Grade 4 teachers, and principals were asked "If you think some children have difficulty adjusting to Grade 4, approximately what percentage are girls? boys?"

Of the parents of Grade 4 children who responded, 22% reported that their child had difficulty making the transition to Grade 4; 78% reported their child did not have difficulty. These percentages are very similar to those of Grade 1 parents (28% vs. 72%) on their children having difficulty making the transition from Kindergarten to Grade 1.

Approximately one-third of Grade 3 (33%) and Grade 4 teachers (31%) and 78% of the principals indicated that they thought some children had difficulty adjusting to Grade 4. In interpreting the data on the percentages of boys and girls, there was a very wide range from zero to over 50%. The most frequently given percentages for girls having difficulty were in the range 5-10% for teachers, while principals indicated under 5%. Teachers and principals most frequently indicated the 5-10% range for boys. However, a more varied pattern emerged in the second most frequent range of percentages. For girls, the second most frequently reported range was under 5% for Grades 3 and 4 teachers, and 5-10% for principals; for boys it was over 50% for Grade 3 teachers, 41-50% for Grade 4 teachers, and under 5% for principals. With the exception of the principals' responses, these results are again similar to those on children having difficulty between Kindergarten and Grade 1.

Of the parents whose children had difficulty making the transition from Grade 3 to Grade 4 ($N=12$), 50% said this was because their child was poorly prepared academically. The second most frequent reason given (17%) was the child's non-Canadian background. As to what the school could have done to help, 46% stated that the school had helped/was helping. Twenty-seven percent indicated that the school could have provided extra help for their child earlier (i.e., in the primary grades).

In response to three questions on children's difficulty in making the Grade 3 - Grade 4 transition being due to (a) curriculum/instructional materials, (b) teacher style/attitude or (c) social adjustment, the pattern of response by Grade 3 and Grade 4 teachers and principals was one of general disagreement to either teacher style/attitude or the difference of curriculum and instructional materials as a primary cause of difficulty. Seventy percent of the Grade 3 teachers and 51% of the principals disagreed with social adjustment as the primary cause. Half of the

Grade 4 teachers (50%) agreed. Thus, there seemed to be no strong consensus as to a primary cause for children's difficulty making the Grade 3 - Grade 4 transition.

One possible approach to the Grade 3-4 transition period is one of a variety of activities/programs to familiarize children with Grade 4 teachers, curriculum, materials, expectations, etc. Grade 3 teachers, Grade 4 teachers, and principals were asked to "Describe any orientation work carried out by you and/or the school with children in preparation for beginning Grade 4." "No orientation work" was the response of 36% of Grade 3 teachers, 85% of Grade 4 teachers and 32% of principals when asked to describe what preparation was done for Grade 4. Of those who indicated that some work was done, 33% of Grade 3 teachers said they began "more Grade 4 type work" (e.g., more independent activities, research projects, longer written assignments). Orientation work reported by Grade 4 teachers was negligible.

Grade 3 and 4 teachers, principals, and parents of Grade 4 children were asked "Do you favour a specific orientation program to help Grade 3 children make the transition to the intermediate grades? Why or why not?" A majority of Grade 3 teachers (65%), Grade 4 teachers (82.5%), principals (80%), and parents of Grade 4 students (70%) did not favour such a program. The most frequently (42%-53%) given reason by all groups was that it was unnecessary.

In summary, the majority of parents, principals, Grade 3 and 4 teachers indicated that the transition between Grade 3 and 4 was not a problem for most children. For children having difficulty (mostly boys), poor academic preparation was the reason given most frequently. The majority of Grade 3 and 4 teachers, principals, and parents did not favour a specific orientation to help children make the Grade 3-4 transition because they felt such a program was unnecessary and that individual teachers should and could deal with the difficulties of individual children. However, parents at all levels (Kindergarten, Grades 1 and 4) indicated they would like more information on what was expected of their child during the year and what the child would be doing.

Summary of Findings

A majority of Kindergarten teachers, principals, and parents of Kindergarten children agreed that the transition into Kindergarten was very important in setting the tone and determining how a child will feel about school. Not one parent disagreed with this statement although a tenth of the teachers and two-fifths of the principals disagreed.

Over three-quarters of the Kindergarten and Grade 1 teachers and principals surveyed indicated that they thought some children had problems making the transition into Kindergarten or between Kindergarten and Grade 1. The pattern of response changed somewhat for the transition between Grades 3 and 4: approximately a third of the Grade 3 and 4 teachers thought some children had problems while again three-quarters of the principals thought there were problems.

When asked if *their* child had difficulties making a transition, 17% of the Kindergarten parents, 28% of the Grade 1 parents, and 22% of the Grade 4 parents said yes. When asked for their perceptions of the reason for the problem, Kindergarten parents most frequently gave "child-centred" reasons (i.e., child's short attention span, shyness, language problem, learning problem, newness in neighbourhood); parents of children in Grades 1 and 4 gave "school-centred"

reasons (i.e., increased expectations for children in Grade 1 and poor academic preparation prior to Grade 4).

Principals and teachers at all three levels indicated that they thought boys had more difficulty making these transitions between grades than did girls. The most frequently given percentage for all groups ranged from 0 to 10% for both boys and girls. However, the second most frequent percentages given by Grades 1, 3, and 4 teachers were less than 5% for girls but 41% or more for boys. Principals responded similarly except for the Grade 3-4 transition where they indicated less than 5% for the boys.

Nearly all Kindergarten teachers did some type of orientation work with children and for parents (most frequently a visit of the children to the Kindergarten during the spring prior to their registration). There was strong support among Kindergarten teachers, parents, and principals for an educational program for parents of children about to be or recently enrolled in Kindergarten. The majority of Kindergarten and Grade 1 teachers and principals agreed that there should be more coordination of Kindergarten and primary programs and more communication between Kindergarten and Grade 1 teachers in order to facilitate children's transitions. On the other hand, 36% of the Grade 3 teachers, 85% of the Grade 4 teachers and 32% of the principals stated that no orientation work was done for children during the Grades 3-4 transition. The most frequent type of activity was beginning more Grade 4 type work. When asked if they favoured a specific orientation program, a majority of Grades 3 and 4 teachers, principals, and Grade 4 parents indicated no, most frequently for the reason that such a program was unnecessary.

Teachers and principals favoured K-1 transition classes for children who need "more time to mature" as well as for children for whom less than a year of Kindergarten would be sufficient. These groups also favoured shortened Kindergarten sessions in September while Kindergarten parents were divided in opinion.

Conclusion

Recommendations were made to the Commission on Education based on the results of this study. One recommendation was that the Kindergarten teachers, Grade 1 teachers, and principals at each school assess the needs of the children and parents and determine if an orientation program to Kindergarten and/or Grade 1 would be appropriate and advantageous. Such a program could meet the needs expressed by parents, teachers and principals for an opportunity to explain these programs and answer questions as well as provide an opportunity for children to experience school activities and meet the teachers. It was recommended that the School Board support any school wishing to implement such a program by providing such funding and release time as may be needed.

Another recommendation was that more Kindergarten - Grade 1 transition classes be established to meet the needs of both the child who is not ready for Grade 1 at the end of Kindergarten and the mature or bright child who needs to progress to a higher level than can be easily provided within the current Kindergarten program. It was further recommended that K-1 transition classes be taught by teachers with training and experience at both the Kindergarten and Grade 1 levels (staffing was not seen as a problem because of the availability of such teachers).

It was recommended also that the policy of shortened Kindergarten days at the beginning of September for the purpose of easing the initial adjustment to school be re-evaluated in terms of the needs of the individual children. An increasing number of children are being enrolled in preschool programs and children who have been in full day programs are less likely to need shortened days than those with no preschool experience. Provision should be made to meet the needs of each of these children in their beginning of Kindergarten.

No recommendations were made about the Grade 3-4 transition, as the groups surveyed did not indicate that this was a problem area.

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Changing Plans and Aspirations of High School Students

Longitudinal studies of student aspirations are complex and consequently rare. This study investigated changes in high school student plans and aspirations during a twelve-year period, 1969 to 1981. Even though the changes overall were not very obvious, substantial changes were observed when the responses of boys and girls were analyzed separately. One of the more significant findings was that while there was a slight increase in the number of students who planned for postsecondary education, the schools placed considerably fewer students in the university entrance program in 1981 than they did in 1969.

The plans and aspirations of high school students have been examined sporadically by researchers and educators for many years and for various purposes. Following the proliferation of studies in the late 1960's, the number of studies on student concerns appeared to decline as research focused more on such immediate problems as declining enrolments and the effectiveness of schools. The activism of the previous decade had subsided and new problems not closely tied to the quiet student generation of the 1970's were the subject of investigation. Thus by 1980 the press to be heard by students had diminished considerably and was generally not the major factor in educational planning for the future.

By 1980, however, interest revived in the whole area of the quality and usefulness of student educational experiences, especially in high schools. This is well illustrated by such studies as *The Quality of School Life* by Trevor Williams and Margaret Batten (1981) in which the authors examined student experiences in Australian high schools. Some of the most visible and influential studies, influential especially in their policy implications, were attempts to obtain comprehensive data on the way in which students view their schooling. Two of these studies were *High School and Beyond* (1981) directed by James Coleman and *A Study of Schooling* (1981) under the direction of John Goodlad.

Both of these studies raised questions about changes in student culture and the implications of these changes for school programs, but thus far neither has

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addressed directly the problem of students' plans and aspirations and the relationship of these plans to program placement. They have, however, questioned the appropriateness of current high school programs and current practices of student placement into programs.

Peng, Fetters and Kolstad (1981), reporting on part of the Coleman study, illustrate the marked differences between public high schools and private high schools in program placement of students.

About one-third of the 1980 seniors in public high schools (34 percent) took an academic program to prepare for college, and 27 percent took a vocational program to prepare for an occupation after high school. In private high schools, this distribution was markedly different. Over two-thirds (70 percent) took an academic program, and 9 percent took a vocational program. These distributions reflect a basic difference in orientation of the two types of schools. Yet the experience and concerns of students in the same type of program are often more similar to one another, even though they are in different types of schools, than they are to those in a different program in the same type of school. (p. 1)

Benham, Giesen, and Oaks (1980), part of John Goodlad's research team, conclude that "Students who don't expect to go to college tend to believe that their high school doesn't consider them very important." They add:

Our findings suggest that, as a rule, students with lower self-concept scores do not plan to go on to any form of higher education. From the literature, we know also that future plans often determine (or are determined by) track placement. Are these students usually found in the lower-ability tracks? If so, it is likely that in some secondary schools these students, and those with higher self-concepts and future plans that include some form of education beyond high school, may rarely encounter each other. It may be that this variable greatly influences peer relationships at the school level. (p. 340)

Goodlad et al. (1979), reflecting on their "A Study of Schooling," conclude that:

This study will have achieved one of its several purposes if it stimulates more and better explorations of what goes on in schools. . . . It will have achieved another if it enlightens our understanding of schools. . . . And it will have achieved a third purpose if groups seeking to improve local schools are stimulated to study and analyze what goes on there. (p. 178)

In a small measure these objectives apply as well to the study reported in this paper. The question of changes in students' plans and aspirations over the past decade remains largely unanswered, as does the question of the appropriateness of current programs for students in the light of their plans for the future. A recent study has provided some interesting information on changes that have occurred in these matters in a Canadian setting.

The Study

The responses of a stratified random sample of 1981 grade 9-12 students to a questionnaire entitled "Student Values Inventory" were compared to those of grade 9-12 students in the same school system surveyed in 1969. The number of students in the 1981 sample was 2 285 compared to the population of 12 951 students reported in the 1969 survey. The proportion of male and female students was approximately the same in both studies (50 percent male), as was the proportion in each of grades 9 to 12.

The school system in which the surveys were carried out is urban in nature with a population of over half a million. It has experienced rapid growth during the period under examination, and it continues to provide every indication for further growth. The changes that have occurred since 1969 are far reaching, involving

expansive growth in most sectors: government, industry, education, and housing. In spite of city policy for distributing lower income housing to most sections of the city, there has been a fairly clear trend for the higher income families to locate in certain sections. As a consequence, since high schools are primarily neighborhood schools, this trend has also maintained the socioeconomic differences between schools in the city. Unemployment has usually been considerably below the national average in Canada, making it possible for students to find work, even during the school year.

One section of the questionnaire dealt with students' plans and aspirations as well as with the current program in which they were enrolled. This paper presents an *analysis of the plans and aspirations of the students* in the two surveys with a view of detailing some of the *significant shifts that may have occurred over the twelve-year period*, and to see how these are reflected in student program placement.

The analysis focuses first on three items which reveal the aspiration level of the students. This is followed by an examination of the plans that the students have for their postsecondary years. Third, an examination of the current programs in which the students are enrolled is carried out to observe the congruence or lack of congruence between the plans and aspirations and the current placement of students in school programs. The paper ends with a few of the significant observations related to the findings on students' aspirations, plans and program placement.

Aspirations of High School Students

The data in Table 1 indicate that students in 1981 were somewhat more desirous of being remembered as outstanding students than were the 1969 students. The difference between the sexes observed in 1969 was sustained; both male and female students showed an increase of 2 percent in this category. In 1981 about 50 percent of the girls and 41 percent of the boys wished to be remembered as outstanding students rather than as athletic stars or as being most popular.

TABLE 1
PERCENTAGE OF 1981 STUDENTS WHO WISH
TO BE REMEMBERED AS OUTSTANDING STUDENTS

Students	1969 (N=12951)	1981 (N=2285)	Change
Boys	39.2%	41.3%	+2.1%
Girls	47.5	49.5	+2.0
ALL STUDENTS	43.3	45.4	+2.1

The students were also asked to indicate what level of university education they anticipated to achieve. The analysis of the responses to this item is provided in Table 2. The analysis is restricted to the percentage of students who expected to earn a university degree.

TABLE 2
PERCENTAGE OF 1981 HIGH SCHOOL STUDENTS
WHO EXPECT TO EARN A UNIVERSITY DEGREE

Students	1969 (N=12951)	1981 (N=2285)	Change
Boys	44.4	42.0	-2.4
Girls	31.2	40.4	+9.2
ALL STUDENTS	37.8	41.2	+3.4

Overall the proportion of students who expected to earn at least one university degree increased from 37.8 to 41.2 percent. However, the significant changes occurred between the sexes: the proportion of boys who expected a university degree declined by 2.4 points while that for girls increased by over 9 percentage points. This is tantamount to a 30 percent increase for the girls and a 5 percent decline for boys who expect to earn a university degree.

The findings in the study *High School and Beyond* (1981) indicated that 46 percent of the U.S. seniors expected to complete a degree program. In comparison, 48.6 percent of the Edmonton grade 12 students have similar expectations.

Table 3 provides a comparison of expected median income of students ten years after high school.

TABLE 3
EXPECTED MEDIAN INCOME OF HIGH SCHOOL STUDENTS
TEN YEARS AFTER SCHOOL

Students	1969 (N=12951)	1981 (N=2285)
Boys	\$8,478	\$36,638
Girls	6,554	31,785
ALL STUDENTS	\$7,540	\$34,142

The income students expected to make ten years after high school increased more than fourfold during the twelve-year period. Several interesting observations arise out of these findings. First, the difference in expectations between boys and girls was maintained, even though the expectation of the girls increased slightly more than that of the boys. Second, the expectations of the students remained very close to their estimated family income. To illustrate, in 1969 the estimated median family income was \$6,327 which was just slightly lower than the expected income by students of \$7,540 in that year. In 1981 the estimated median family income was \$31,954, again somewhat below the expected student income of \$34,142.

In summary, the 1981 students wished to be remembered more as outstanding students than did the 1969 students. A considerably greater proportion of the 1981 girls and a smaller proportion of 1981 boys expected to earn a university degree compared to the 1969 students. All of them expected an income that was at least four times the 1969 expected income and slightly above the estimated current family income.

Plans of High School Students

The plans of high school students were obtained through student responses to three items which are analyzed below.

The first item relating to future plans requested students to indicate whether or not they had chosen their profession. The analysis of responses to this item is presented in Table 4.

TABLE 4
PERCENTAGE OF HIGH SCHOOL STUDENTS
WHO HAVE CHOSEN THEIR PROFESSION

Students	1969 (N=12951)	1981 (N=2285)	Change
Boys	53.3%	56.7%	+3.4%
Girls	59.6	55.6	-4.0
ALL STUDENTS	56.4	56.2	-0.2

Overall no change occurred in the percentage of students who had chosen their profession. However, the data show that 3.4 percent more boys and 4 percent fewer girls had chosen their profession in 1981 compared to their counterparts in 1969. That change removed the discrepancy based on sex which existed in 1969. About 56 percent of the students indicated that they had chosen their profession.

TABLE 5
PERCENTAGE OF HIGH SCHOOL STUDENTS WHO EXPECT
TO ENROL IN A TECHNICAL INSTITUTE

Students	1969 (N=12951)	1981 (N=2285)	Change
Boys	29.5%	38.8%	+9.3%
Girls	17.0	29.1	+12.1
ALL STUDENTS	23.2	34.1	+10.9

Students were also asked to indicate if they planned to enter a technical institute after high school. The data, as presented in Table 5, reveal that a substantial increase has occurred from 1969 to 1981 in the proportion of students who plan to enrol in a technical institute. The increase for girls is somewhat greater than that for boys with the combined proportion increasing from 23.2 to 34.1 percent.

Finally, students were asked to state whether or not they planned to go to junior college, teachers' college, nurses' training, or university after high school. Just over 50 percent of the students indicated that they planned to attend university (as described in the item), practically unchanged from the plans indicated in 1969. Table 6 presents the summary of the responses.

TABLE 6
PERCENTAGE OF STUDENTS WHO PLAN TO ATTEND
UNIVERSITY OR RELATED INSTITUTIONS

Students	1969 (N=12951)	1981 (N=2285)	Change
Boys	50.2%	45.8%	-4.4%
Girls	49.6	56.3	+6.7
ALL STUDENTS	49.9	51.0	+1.1

The most significant finding in relation to university plans was that the proportion of boys planning for university education declined by 4 percentage points while that for girls increased by close to 7 percentage points.

In summary, students' plans have changed substantially from 1969 to 1981. A greater proportion of boys and a smaller proportion of girls have chosen their profession. The difference between them in this regard had disappeared. A considerably larger proportion of students plan to pursue technical education. Lastly, a smaller proportion of boys and a larger proportion of girls plan to pursue university type education.

Current Status of High School Students

Two items were analyzed to see whether the changes in aspirations and plans were congruent with the students' current school placement and experiences. The first sought information about favorite subjects, and the second information about program placements of the students.

As is evident from the data in Table 7, a shift has occurred in the degree to which mathematics and science are seen as favorite subjects. The change is especially significant for the girls. In total, 28 percent of the students chose these subjects as their favorite ones, an increase from 23 percent in 1969.

The percentage of students in the academic program (university entrance) is provided in Table 8. For this table only, the sample was restricted to students in grades 10-12, because the grade 9 students are not always placed in a particular program.

TABLE 7
PERCENTAGE OF STUDENTS WHO CLAIM THAT MATHEMATICS
AND SCIENCE ARE THEIR FAVORITE SUBJECTS

Students	1969 (N=12951)	1981 (N=2285)	Change
Boys	28.9%	31.7%	+2.8%
Girls	17.1	24.2	+7.1
ALL STUDENTS	23.0	28.0	+5.0

TABLE 8
PERCENTAGE OF STUDENTS IN THE ACADEMIC PROGRAM
(Grades 10-12)

Students	1969 (N=9730)	1981 (N=1704)	Change
Boys	60.7%	41.8%	-18.9%
Girls	56.9	47.4	- 9.5
ALL STUDENTS	58.8	44.5	-14.3

The percentage of students in the academic program has declined sharply during this 12-year period, dropping to 44.5 percent from 58.6 percent in 1969. The decline, though substantial for both sexes, is especially sharp for boys. The proportion dropped 18.9 percentage points from 60.7 to 41.8 percent. It is worth noting that in 1969 a greater proportion of boys than of girls were in the academic program; in 1981 it was reversed.

To sum up this section it is interesting to note that a greater proportion of the 1981 students saw mathematics and science as their favorite subjects compared to the 1969 students. However, more significant was the finding that a much smaller proportion of high school students were enrolled in the academic program in 1981 than in 1969. The decline was especially precipitous for boys.

Related Findings, 1981 Students Only

A number of related findings, especially in regard to student curricular placement, were obtained through further analysis of the data. Placement in the academic program was not significantly related to students' having a job or to mothers' having a job outside the home.

On the other hand, placement in the academic program was significantly and positively related to the father's occupational status, student attitude toward achievement, frequency of Sunday School or church attendance, and time spent on homework. It was negatively related to time spent watching television.

Just about 80 percent of the students in the academic program planned to enter university. Just over 35 percent of those in the general program also planned to enter university, for which they were apparently not being prepared.

The extreme variation between schools in student placement in the academic program poses a serious problem for system-wide policy making. The percentage of Edmonton students in the academic program ranged from 81 percent in one school to 21 percent in another. The range in percentage of students in the general program in schools varied from 19 percent to 55 percent. Coleman points out that 70 percent of students in U.S. private schools were in the academic programs, in sharp contrast to the U.S. public schools in which 34 percent of the students were placed in the academic programs.

Finally, as can be seen from Table 9, the desire for change in programs was fairly strong among the 1981 Edmonton high school students. Perhaps, most germane to this analysis was the finding that 19 percent of the students in the general program and 25 percent of those in the vocational program would like to change their programs.

TABLE 9
PROGRAM CHOICES 1981 HIGH SCHOOL STUDENTS
WOULD MAKE IF COMPLETELY FREE TO DO SO

Program in which students were placed	Choices Students Made (in percentages)			
	Remain in Program	Change Program	Change School	Leave for Work
University Entrance (N=738)	77%	11%	9%	3%
General (N=520)	64	19	8	9
Vocational (N=396)	55	25	6	14

Findings and Observations

The Technological Trend

Overall the 1981 high school students revealed a slight trend toward a more academic orientation. This trend was centred around a much greater appreciation of mathematics and science, and a greater disposition toward further preparation in technical areas, as well as continued interest in university education. About 55 percent planned to enter university and 35 percent planned for technical education. There is overlap in these figures but they indicate a high level of academic/technical aspiration.

The Economic Drift

Expectations of much higher income in the future suggest a real change among students. However, the change appears to be closely tied to current experiences of family income and thus the trend can be described as a drift consonant with the rapid escalation of income during the 12-year period. The students failed to project inflation in their income aspirations, as did the students in the 1969 survey.

The Male Female Shift

All indications pointed to a higher female enrolment and a decreased male enrolment at the university in years ahead. Female students also indicated much more interest in technical education than did their counterparts in 1969. The overriding value change in which money has become a major factor in the student culture may be partly responsible for the shift that has occurred. Boys in greater numbers appear to have found avenues toward achieving paying positions through jobs rather than through education; girls may have found the reverse to be the case for them. A fairly large proportion of boys exhibit a new awareness that they can develop their self-concept and independence much faster through work than through further education.

The Program Paradox

The rapidly decreasing proportion of students in the university entrance programs in schools seems completely contrary to the plans and aspirations of the students themselves. More than one-third of the students in the general program entertained plans for a university education. The great variation in student placement practices between schools suggests that inequities in student treatment may have crept into the system. This view is reinforced by the large percentage of students presently in the general and vocational programs who would like to change their programs. This paradox points to a need for further research, and if such research supports the findings of this study, it calls for a major policy revision in curriculum and in student placement in programs.

Conclusions and Implications

It is possible that in the desire to provide more options and programs in high schools, inequities in treatment of students have been increased. Decentralized programming, school-based examinations, and student choices of courses may have led to greater disparity in actual treatment of students even though designed to create situations where schools would be able to meet student needs on a more individual basis. The great differences between schools in the proportion of students in the academic stream does not reflect students' aspirations nor in all likelihood their ability. The need for a large scale study of curriculum for Alberta youth is strongly suggested by the findings of this study. What in the present pattern of behavior of students and in their plans and aspirations of the future is important for curriculum? How can the students be best prepared as they choose to work or to enter postsecondary education? At this moment the schools do not appear to reflect the increasing academic nature of students nor their increased aspiration level, especially by the girls. Perhaps the usefulness of the general program in the educational experiences of students is in need of careful review.

A further study is suggested relating to student placement in programs. Does the province grant students a right to an academic education if they desire it? If this is the case, is it being denied to some students directly through school placement of students into programs? Do schools encourage students to reduce their expectations rather than raise them by placing them in a challenging program? Do schools deny students access into programs they might benefit from most? Do they take into account students' plans or expectations?

An additional question is raised by student placement policies and practices. There is sufficient evidence that where students are expected by schools to perform

well they tend to do so. The reverse is also true. This self-fulfilling prophecy principle may be operating at times to students' disadvantage in school placement decisions. Does this violate the democratic right of students to receive the best possible education in our public schools?

Inseparable from this concern is the role of guidance and counselling in schools. To what degree do these services act in accord with other school practices to respond to the needs of students? Are they responsive to the educational and other plans of students, expressed or unexpressed? Has the traditional guidance function become somewhat inappropriate for modern youth? Is it possible that many students are placed in groups where they will be denied working with highly motivated students? Benham et al. (1980) recognize the importance to learning of the nature of the group of students with whom an individual is associated. They state that "Highly structured curriculum tracks in high school may produce distinct student cultures, greatly limiting the range of peer relationships" (p. 340).

Clearly the postsecondary educational institutions may have to look carefully at their programs and clientele. The indications that the proportion of girls will continue to increase in universities and colleges while that of boys will decrease presents an interesting challenge. The continuing increase in demand for technical education is also a factor to be noted. The results of the study seem to indicate that Alberta youth is viewing the future with great reality. Their significantly higher value placed on money or wealth together with a somewhat increased value on postsecondary preparation appear to be clearly reflected in their outlook and plans for the future.

Perhaps the most significant feature of the student plans is the substantial increase in the number of students who expect to complete graduate degree programs. The proportion of students with such plans has doubled and girls now have practically the same expectations for postgraduate study as the boys.

The questions raised thus far are disturbing, especially to those who believe that the school, as developed in North America, has a special role in moving society toward equality and in nurturing educational development within each student. Perhaps after thorough rethinking of our educational offerings we might find that schools have failed to achieve their basic educational goals. Jackson (1982) points out that the schools are probably "inefficient institutions for equalizing income or reducing class differences, and can make only limited contribution to eliminating prejudice and stereotyping" (p. 98). In fact, unless a thorough analysis of the philosophy and practice occurs to alert educators to the consequences of their actions, schools can actually become counterproductive in achieving equality and quality in education, even though both objectives are almost universally supported.

The overall conclusion that is suggested by the findings of this study is that the plans and aspirations of many students in our high schools may be thwarted by the practices of schools in placing them in positions which make their plans unrealistic. There are hardly any outside controls or checks on the schools which, consequently, vary widely in their curriculum and placement policies. If these findings are supported by more in-depth studies, a rethinking of our secondary school philosophy and practice is of utmost urgency. Could it be that schools are not responsive to students who anticipate a future unlike the one that is suggested by the current high school curriculum? Do some of the current high school programs have the effect of limiting the opportunity of those students who take them?

Of particular importance to the theory of curriculum development is the place of the student in such a model. How can curriculum theorists incorporate a meaningful student component, a practical component in a model for curriculum development? How can this model be communicated to the curriculum decision makers in school? Who can monitor the individual schools and ensure that curriculum offerings and placement of students in programs reflect quality and equality in education, and ensure that the students' plans and aspirations for the future are a meaningful component in the educational process?

Two other research problems are suggested by the findings of this study. One relates to an examination of the relationship between economic conditions in a society and students' aspirations and program placement in schools. The other centres on the nature of the relationship of students' aspirations and placement in programs to decentralized curricula and decentralized budgeting. Both areas could prove rewarding in providing information on the important area of students' plans and the school system responses to these plans. The findings might throw light on why changes occur over time in student placement into programs and why differences in placement practices appear between schools and between school systems.

The nationwide survey in the United States by Yankelovich Associates (Bennis, 1976, p. 166) reveals that there is a diminishing of differences among young individuals with regard to basic lifestyles, goals and career aspirations. The survey shows that the difference between classes has practically evaporated. Bennis (1976) concludes that on the basis of this, "we're going to have to create institutions in which people can feel the responsibility of growing and continuing to learn, where contributions are prized, and where independence and autonomy are encouraged" (p. 167).

Willower (1982, p. 92) suggests that public schools still tend to see their students "as reflection of the larger society" which they picture as a class society. Consequently, "lower class or working class students are more likely to suffer academically, have fewer opportunities for leadership, and be treated less well than their counterparts from more advantaged social class backgrounds." Willower's conclusion seems to receive considerable support from the findings of this study especially in the way students have been increasingly placed in a "general course." This may not permit the students to prepare themselves for the future, the shape of which is always speculative.

Further research is suggested to examine in greater detail the aspiration-program paradox that seems to emerge. Bennis (1976, p. 161) talks of the "entrepreneurial vision, a sense of perspective, and, most of all, the time to spend thinking about the forces that will affect the destiny" of an institution. It takes leadership, courage and knowledge to prescribe to each student a program that is the most challenging investment for his or her future, a program that is not based on past stereotypes or classes but on the aspirations, potentials and future environment of the learner.

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An Examination of the Effects of Extending the Practicum on the Professional Dispositions of Student Teachers

This paper contains a comparison of the effect of length of practica on three professional predispositions of student teachers. Two Canadian teacher education programs were chosen, one having a three-week practicum, the other lasting twenty weeks. Student teachers completing the longer program had significantly lower values than similar student teachers completing the shorter program. Discussion centers on the problems of spending a prolonged period of time in this indeterminate role situation and its possible influence on the student teacher's perception of reality. It is proposed that only after a lengthy practicum does the impact of the nature of the job overcome the idealized view of the profession.

The decade of the eighties should prove to be a time of thoughtful consideration for education faculties. Following the initial shock of the dramatic decline in public school enrolments and its subsequent effect on teacher education institutions, educators have realized that they now have an unprecedented opportunity to improve their programs to promote the further professionalization of teachers. For the first time in several decades, faculties of education are not required to rush teachers through inadequate programs in an effort to meet a crisis situation. In attempting to improve the professionalization process, education faculties are reassessing their academic requirements as well as the socialization

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process that enables students to become teachers. The area of greatest concern in this socialization process is the student teaching practicum. Because practising teachers and student teachers universally view the practicum as a peak learning experience, faculties of education have been under great pressure to extend the length of the practicum and incorporate many of the features found in other professional internships. As faculties of education continue to examine these options, the lack of adequate information becomes more apparent.

The purpose of this report is to examine only one aspect of this professionalization process, the practice teaching component. Furthermore, this study will consider only three professional attitudes of student teachers as they are influenced by extension of the practicum. It should be noted that in this research, the influence of extending the practicum on the technical competencies of teachers is not studied; rather the attitudes that may predispose a teacher to become a more professional teacher are examined. While it is recognized that improved technical competencies are essential to the further professionalization of teachers, in this study it is claimed that there is a second professional dimension of equal importance: the notion of professional commitment which separates expert technicians from professionals. Weber (1947) refers to it as "the devotion to a task for its own sake without ulterior motives" (p. 33). While this concept of service is more difficult to evaluate than the attainment of technical competencies, it is argued that the development of certain professional predispositions is essential if the recruit is to be considered to be something more than a teaching technician.

The conventional wisdom in Canada maintains that the extension of student teaching practica will promote the professionalization of teachers. Evidence that this belief is widespread was presented by Richards and Thiessen (1978):

There has been a national trend towards longer periods of student teaching resulting in the so-called internship which may be up to sixteen weeks in length. The rationale for such a trend has been well documented and is accepted by almost all institutions. (p. 63)

The current study expresses reservations about this trend on two very basic points. First that this expansion of the student teaching practica has often taken place without a concomitant increase in the total teacher education program. That is, in most universities across Canada it is still possible to graduate with only one year of teacher education. Allen (1976) singled this out as his initial concern about student teaching practica: "Unless total time is increased, extra time in schools will reduce time on campus and consequently reduce the amount of course work that many professors and teachers consider essential" (p. 47). The second concern, the one that is examined more closely in this study, is the influence of the extended practica on the professional predispositions of student teachers. Once again Allen (1976) has voiced this concern and appealed for more empirical research on the topic:

There is some evidence that a practicum can damage a student teacher's professional self-concept (Coulter, 1974; Wright & Tuska, 1966). Recommendations by researchers who have identified this tendency include gradual introduction to teaching at varying rates, emphasis on productive communication between student and supervisor and careful counselling. (pp. 47, 48)

Rationale

The present study is an extension of research (Clifton & Covert, 1977) which was concerned with the effects of the length and nature of the practice teaching

experience on certain professional attitudes of student teachers. In the current paper the student teaching practica at two Canadian universities are examined in terms of three professional dispositions: motivation towards teaching, attitudes towards teaching as a career, and self-concept as a student teacher. The reason for selecting these two programs for analysis is that they represent the extremes in time spent doing practice teaching in Canada. Most of the students in the Western university participate in a total of twenty weeks of practice teaching, while most of the students in the Eastern university have three weeks of practice teaching. More precisely, of the 39 weeks devoted to teacher education at the Western university, roughly one-half of the time is spent in practice teaching, while at the Eastern university, about seventeen percent of the one-year teacher education program is composed of a teaching practicum.

While these are the most obvious differences between these two teacher education programs, there are several others which serve to confound any similar comparative studies. The educational priorities of the two teacher education programs are obviously quite different and the faculties are composed differently with varying competencies. The student body is mainly an indigenous one, which means that they may be shaped by two separate and distinctive cultures. Given these typical problems, every effort has been made to ensure that the two samples are matched on those characteristics that compose background information for comparative purposes in research of this type.

The Practica

The Eastern university has four different practice teaching programs; however, the vast majority of student teachers (over 80%) enroll in a practice teaching program which concludes with a two-week block of practice teaching in the spring. These student teachers observe in a number of different classrooms for one-half day each week during a 13-week semester. Following the end of the academic year, they spend two weeks in one school completing their practice teaching. During the two-week period, each student teacher works closely with a cooperating teacher who is responsible for assisting the student teacher and evaluating his or her performance. Therefore, students participating in this student teaching program would have approximately three weeks of actual classroom experience prior to their certification. The research reported in this paper was concerned only with the two-week block of student teaching.

The teacher education program at the Western university is basically a one-year program, with both elementary and secondary students completing their studies within three 13-week terms. Out of a total of 39 weeks, approximately 20 are spent in a practice teaching situation. In order to accommodate this large student teaching component, classroom teachers-on-leave (Faculty Associates) are employed for a one-year period with the possibility of a one-year renewal. These Faculty Associates work closely with their student teachers in the schools and are responsible for instruction in certain methods and techniques of teaching, liaison between schools and university, and general supervision of the student teachers during the practicum.

The practice teaching periods are separated into two blocks of time spent in the schools. The first is a six-week experience which follows one week of introduction to classroom teaching. During this first term, student teachers are introduced gradually into their teaching responsibilities by tutoring individuals, working with

small groups, and eventually presenting a lesson to the whole class. Before the end of the six weeks, each student will prepare and present a unit from his or her chosen curriculum area. Following this period of practice teaching, the students return to campus for the second half of their first term for a course in which they reflect on their classroom experiences and study a variety of teaching concepts and skills.

The second practice teaching period follows and is for an entire 13-week semester. This course is designed to induct the student teacher into the teaching role by gradually building the teaching load from one-third of a load to a full load in the final four weeks of the semester. This experience is also supervised by the Faculty Associates in conjunction with the cooperating teachers in the schools. The students spend a third semester on campus, taking courses that will complete all of the academic, professional, and certification requirements. The research conducted for this study is the result of measurements taken only during the 13-week semester of practice teaching. These two university programs are represented diagrammatically in Figure 1.

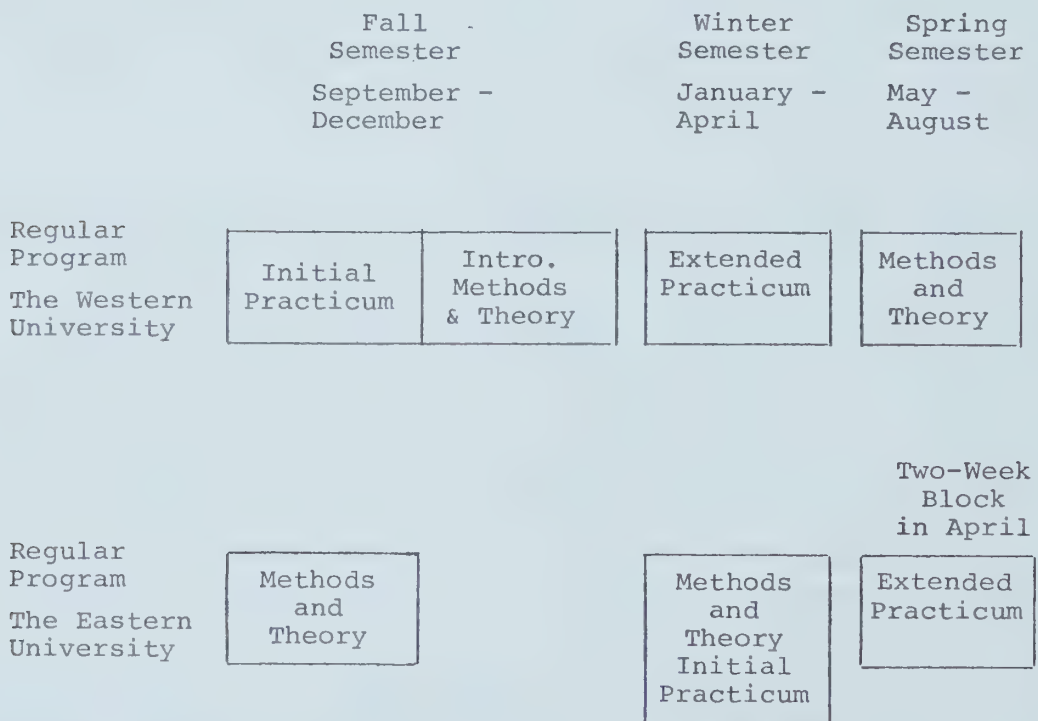


Figure 1.

Method

Sample

Practice teaching is a required component of the teacher education program at both universities. In the Eastern university all students who were enrolled in the student teaching course were asked to complete a questionnaire during the first week of September 1977. From this group of student teachers, 103 completed a second questionnaire at the end of the two-week block in April 1978. From this latter group, 30 student teachers who had completed both the first and second questionnaires were randomly selected for this study.

Similar questionnaires were administered to the Western university student teachers in January of 1980. In this instance, 133 student teachers completed the first questionnaire prior to beginning their 13-week semester of student teaching. From the group who had completed the first questionnaire, 81 completed a second questionnaire at the end of their student teaching experience. From this latter group a random sample of 30 was selected to provide the comparative data.

Methodology

Data were analyzed for two groups of student teachers at two Canadian universities undergoing different kinds of practice teaching programs. In all instances the questionnaire asked the students to identify themselves and give such background information as age, sex, and year of university, in addition to completing sets of items designed to measure self-concept, motivation, and attitudes. Each questionnaire took approximately 20 minutes to complete. Following the data collection, the mean scores on three dispositions were compared across the groups of students in order to determine whether there were significant differences. In addition, changes in the scores between the beginning and the end of the testing period were examined.

The Dependent Variables

In this study, three dependent variables were used: self-concept as a student-teacher, motivation towards teaching, and attitudes towards teaching as a career. In order to construct these dependent variables a number of questionnaire items, drawn from a variety of sources, were factor analyzed. Principal component solutions were used and items were considered to load on a factor if their factor loading was .35 or greater (Nunnally, 1967, p. 315). Since unidimensional scales were constructed by adding the appropriate items together, only one factor was extracted from each set of items.

The measure of self-concept as a student teacher was constructed from seven items on a semantic differential (see Osgood, Suci & Tannenbaum, 1957; Osgood, 1962; Walberg, 1967). The semantic differential had nine original items but the factor analyses of these items suggested that a more parsimonious and meaningful scale could be constructed from the seven items which loaded on the first factor. These items were: Kind-Cruel, Pleasant-Unpleasant, Weak-Strong, Nice-Awful, Active-Passive, Happy-Sad, and Fair-Unfair. The loadings on the principal component were .59 or greater and the alpha reliability coefficient for the variable was .85.

The measure of motivation to become a teacher was constructed by summing seven Likert-like items obtained from a previous study (Clifton & Covert, 1977). All students were asked to indicate: their desire to become teachers, their motivation to do well in education courses this year, how hard they work at courses this year, the amount of work they are willing to do in order to become a teacher, the importance of becoming a teacher, their evaluation of teaching as an occupation, and their current level of competence to teach. None of these items had loadings below .39 on the principal component and the alpha reliability coefficient for the variables was .83.

Finally seven items were used to obtain a measure of the student teachers' attitudes towards teaching as a career. These items were obtained from an eleven-item scale constructed by Merwin & DiVesta (1959) and DiVesta and Merwin

(1960). The items sought to identify teachers' attitudes toward: the desirability of teaching as a career, the advantages and disadvantages of the job of teaching, the importance of teaching as a career, the sacrifice of long hours, extended college education and relatively low pay, the degree of commitment to the profession, the comparison of teaching with other jobs, and the level of enjoyment expected from teaching. For the seven items, the loadings on the principal component were at least .47 and the alpha reliability coefficient for the scale was .79.

Results

In the present study it was hypothesized that there were significant differences between the two groups for their mean scores on the three dependent variables. More specifically, it was hypothesized that, following the longer practice teaching programs at the Western university, the student teachers in this program would have significantly higher mean scores than at the beginning of the program and that the increase in mean scores for the student teachers in the two-week block at the Eastern university would not increase as dramatically.

Table 1 presents the means scores and *t* values for differences between the pretests and the posttests. In this table the term "pretest" implies the scores obtained from the first questionnaire and the term "posttest" implies the scores obtained from the second questionnaire. It should also be mentioned that student teachers at the Western and the Eastern universities had no significant differences on the background characteristics of age, sex, marital status, degree, year of university, and program of study.

TABLE 1
MEAN SCORES ON DEPENDENT VARIABLES
BY STUDENT TEACHING PROGRAM

Variable	Test	Eastern Students	Western Students
1. Self-concept as a student teacher	Pretest	28.73	30.38
	Posttest	30.37	30.89
	t-value	- 2.94*	- 1.14
2. Motivation towards teaching	Pretest	29.31	30.86
	Posttest	29.72	26.76
	t-value	- 0.72	13.49**
3. Attitudes towards teaching as a career	Pretest	37.14	38.87
	Posttest	37.93	28.14
	t-value	- 1.03	27.35**

* *p* < .01
** *p* < .001.

The results indicate that, when considering the pretest means only, the students at the Western university scored significantly higher on all three measures than similar students at the Eastern university. In view of the results of the pretest and posttest comparisons, it can be seen that while in both groups, student teachers' self-concept declined while on the practicum, only that of the Eastern students dropped significantly. Table 1 also indicates that the Western students

experienced dramatic drops in their motivation towards teaching and attitudes towards teaching as a career. Even though the Western students began their student teaching experience with higher attitudes in all three categories than those of the Eastern students, something that occurred during the practicum affected them adversely and influenced a highly significant drop in both their motivation and attitude.

Discussion

In this study it was hypothesized that the Western university student teachers participating in the 13-week practicum would have predispositions toward being professionals that would increase to a greater degree than those of the student teachers at the Eastern university who had participated in only two weeks of practice teaching. This hypothesis was derived from the conventional wisdom which pervades much of teacher education today and is supported by some of the recent research conducted in Canada dealing primarily with the professional attitudes of student teachers.

Gregory and Allen (1978), analyzing data very similar to those gathered in the current research, had results that supported this common sense hypothesis. As a result of their study, they claimed that the positive professional attitudes were attributable to the nature of the practicum experience. Such things as gradual introduction into the teaching activities, orientation sessions and workshops during the practicum, extended periods of time allowed in the classroom, teaming of student teachers and supervisors by practising teachers, all promote a favourable atmosphere for the development of positive attitudes.

In another study (Clifton & Covert, 1977) it had also been argued that the integration of the practicum with academic work was responsible for improved attitudes and self-concepts of student teachers. These socialization factors that encouraged the integration of the theoretical and practical program were present in the Western university student teaching program. In addition to these factors, the Western university student teachers had already completed six weeks of an introductory practice teaching experience prior to beginning the extended practicum. Furthermore, this introductory session was concluded just eight weeks prior to a 13-week practicum. It would seem that many of the initial problems would be overcome and the reintroduction into the school setting would proceed quite smoothly. Even though these conditions seem to have been met by the Western university teacher education program, these perplexing findings about professional attitudes persist.

One possible explanation of these findings might be developed from an ethnographic perspective. This approach would suggest that the four questionnaires given in this current study were in reality four snapshots of student teaching experiences taken at four different times. This hypothesis proposes that one picture was taken at zero weeks of student teaching (Eastern university pretest), a second at three weeks (Eastern university posttest), a third at six weeks (Western university pretest), and a fourth at twenty weeks (Western university posttest). This could be an explanation for the higher pretest scores of the Western university students; they had already completed a six-week practicum while the Eastern university students had had no previous student teaching experience.

Conclusions drawn from these observations would indicate that there was a trend toward improved motivation to become a teacher and a trend toward more positive attitudes about teaching as a career, at least up to the sixth week. There is, however, a significant decrease in both of these variables when the measures taken at the twentieth week are considered. In considering the self-concept variable, the same argument could be made. While there was a trend toward lower self-concept during the entire 20-week period, the only significant difference occurred within the first three weeks of the practicum. Therefore, the findings resulting from the ethnographic hypothesis would be no different than those coming from a comparison of pre- and posttest data within institutions. From an examination of the means of the four ethnographic snapshots one might conclude that improvements in professional predispositions reach a point of diminishing returns somewhere between the third and the sixth week, and following the sixth week dramatic declines in motivation to become a teacher and attitudes towards teaching as a career are quite possible. The data available for analysis in the current study do not lend themselves to making these kinds of comparisons and therefore the within institution comparisons are more appropriate.

Another study in which an attempt has been made to use this approach involves some unreported research which also used measures analyzed by Gregory and Allen (1978). In this thesis study, professional attitudes were measured at several points during the practicum and it was found that attitudes rose and fell depending upon the phase of the program. It was claimed, for example, that the ninth week was a particularly depressing time because student teachers were taking on a full teaching load with all of the attendant difficulties and tensions. It was further argued that by the thirteenth week these problems had been overcome and positive professional attitudes were developing.

In offering an alternative explanation about the socialization process of student teaching, it might be important to point out that the improvement in professional attitudes found in the earlier study by Clifton and Covert (1977) occurred when student teachers were enrolled in the first year of a three-year program; the students in this former study were not part of a one-year teacher education program. Perhaps their professional predispositions could be more idealized because they were not scheduled to do their practice teaching for at least two more years. This notion of an idealized view of the profession may play a larger role in describing student teacher attitudes than had previously been anticipated. If the student teacher has an unrealistic view of what teaching is like, it may be quite a shock to be exposed to the real situation.

Heddendorf (1969), in reporting similar findings, calls this phenomenon "Reality Shock." His analysis of data

suggests a sense of awareness on the part of the student that the real classroom and school situations are inconsistent with the expectations of the student . . . there is a move away from altruistic attitudes. The student teacher is no longer clearly supportive of the real or nominal value of the teacher as one who is altruistic. (p. 145)

This shock may not become fully realized until some time has elapsed "on the job." If the student teacher sees himself more like a student than a teacher, it would not be necessary to take on the responsibility of the job. This may help to account for his favourable attitudes towards teaching, especially since he knows that "practice teaching" will end in a few weeks. However, as the student teacher becomes more involved in the teacher role and the situation becomes more of a

responsibility, the possibility of escape becomes less of an option and therefore attitudes about the profession may decline.

The student teachers completing only two weeks of practice teaching had never experienced the effects of having 25 children in their charge for five hours a day, five days a week. Only with the shouldering of this constant responsibility will more realistic attitudes toward the profession surface. When this happens in the kind of marginal student teaching role situation described by Clifton (1979), the professional attitudes may be depressed. The longer the uncertainty persists about whether the student teacher is a student or a teacher, the more difficult it is to feel adequate in either role. While it may have been interesting to assume the role of teacher initially, the extended practicum may engender feelings of hostility and frustration because the learning has peaked and the task now becomes a drudgery devoid of adequate monetary or psychic rewards.

While many studies have indicated that longer practice teaching experiences help teacher trainees to become more proficient in performing the skills and techniques necessary for classroom performance (Beecher, 1950; Houston, 1967; Lupone, 1960; and Shea, 1964), none have found that the length of practicum has had a positive influence on teacher beliefs or values. It has been claimed in this study that the development of professional predispositions is as important to the professional teacher as technical competencies. This notion of professional commitment, which separates a professional teacher from a technically proficient teacher, is directly reflected in the attitudes and beliefs that recruits hold about teaching as a career. It seems appropriate that this sense of commitment should be developed as a part of the training of student teachers. It has been assumed that by extending the student teaching practicum, attitudes toward professionalism and teaching as a career would show gains similar to those experienced in technical competency. The results of this and other research raises doubts about the accuracy of this claim.

Much of that early research referred to above about the length of practica and its effect on professional attitudes is not very encouraging. For example, Walberg (1967b) found that student teachers' professional self-concepts declined as a result of their practice teaching experience. Furthermore, Kropp and Anderson (1963) state as a result of their study that "the internship semester does not seem to be an especially fruitful time during which to develop attitudes about the role of the teacher" (p. 369). More recently Cohen, Peters and Willis (1976) state that "the general consensus regarding the impact of the practicum experience is that it has little or no effect on the most ingrained educational beliefs of student teachers" (p. 15). Altman and Castek (1971), in their review of research, state the following: "Kinard (1968), Watson (1964) and Castek (1970), in separate studies, found no overall positive significant difference in student teachers' attitudes after one semester of practice teaching" (p. 46), and summarise their findings in this way:

From the studies reviewed, it appeared that not only could the practice teaching experience be described as being questionable in terms of developing a positive attitude toward teaching, but more seriously, as one with the potential for having a detrimental effect upon the teacher trainee. (p. 11)

It seems clear that more research needs to be done to see what influence the extended practicum has on student teachers. For example, a longitudinal study that followed student teachers, who had positive or negative professional predispositions during their practica, on to their first few years on the job might be undertaken to determine whether there is any correlation between professional

predispositions and the professional development of a teacher. Another study might investigate the development of professional attitudes among first year teachers who had experienced long or short practica. Perhaps the first year teachers could be questioned to determine if rewards received on the job have improved or depressed their professional attitudes and whether salary is adequate compensation for the encouragement of positive attitudes or if other psychic rewards are also necessary.

Perhaps Cohen, Peters and Willis (1976) summarize the research best when they state:

The matter of the effect of the length of the practicum on changing the preferences and beliefs has not yet been resolved. Since this is an important concern for teacher educators, it would seem necessary to compare practice of different lengths of time for their effects on preferences and beliefs of student teachers. (p. 20)

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Sex-Related Differences in High School Science and Mathematics Enrolments: Do They Give Males a Critical Headstart Toward Science- and Math- Related Careers?

Although high school mathematics enrolments have been proposed as a critical step toward careers in science-related professions, this view appears flawed in not considering the quality of instruction and learning taking place in high school classrooms. We examined previously published evidence that has been adduced in support of the hypothesis that enrolments play a critical role and failed to find convincing support for the "enrolments effect" hypothesis. A re-examination of data on sex-related differences in the rate of decline in mathematics enrolments in grades 9 - 12 was carried out. The analysis suggested that these differences were too small in absolute magnitude to account for large gender differences in postsecondary career pursuits as was assumed. The article applies ideas from assimilation learning theory toward explaining these results with the hypothesis that large sex-related differences found in post-high school science and mathematics enrolments may result from a greater socialization of women into rote-mode learning strategies that are ineffective in advanced college mathematics and science courses and scientific careers.

High school mathematics enrolment has been proposed as playing a "critical filter" role in the career development of female scientists (Fennema, 1977; Gilmartin, 1976; Sells, 1976; Wise, 1978). The few women who do persevere in mathematics and the sciences tend to have a background in high school mathematics (Sells, 1976), and the thesis of this paper is that it is the quality of the

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instruction and learning taking place in the classroom, rather than mere attendance or enrolment in school mathematics, that provides the key to perseverance in science-related professions.

The theoretical perspective of this paper turns upon the distinction between rote and meaningful learning styles, a distinction which is rooted in a particular view of learning and memory. Precursors of this view, as early as Bartlett (1932), held that information only becomes meaningful and memorable through a constructive process whereby new inputs are linked with already existing schemata. This view stands opposed to the older associative learning theories that held that significant learning occurs automatically through repeated reinforcement. While those who offer mathematics enrolments as a critical variable in science careers do not do so with the intent of identifying themselves with associative learning theories, their thesis that mere exposure to high school mathematics is a critical variable ignores the possible role that alternative learning strategies may play in the cognitive and affective development of students enrolled in science or math courses. The perspectives discussed in this article, however, maintain that the extent of *meaningful* learning experiences, as contrasted with merely occupying seats in high school classrooms, are relevant to career perseverance. The assumption that meaningful learning occurs whenever students and teachers come together does not seem warranted.

The thesis of this article is that school socialization of women toward rote learning strategies provides an alternative explanation for the low persistence of women in science-related careers. The presentation of a theory regarding how this might occur will be deferred until evidence relevant to the "critical filter" hypothesis has been examined. This approach is called for since the latter hypothesis represents a widely held competing view of the role of mathematics and science enrolment in career development of women. Also, we are aware of no studies which directly test the thesis proposed here (though we contend thoughtful educators will not be surprised by our emphasis on teaching for understanding). Thus a brief review of prior relevant studies plus an analysis of previously published data relevant to the critical filter hypothesis, are offered as indirect evidence to support the major thesis of the article. Later we present some data from our research that support the thesis.

Relevant Studies: "Critical Filter" Hypothesis

Several investigators have used mathematics enrolments, or the decision to persist in mathematics, as criterion variables while searching for the variables which best predict these criteria (Fennema & Sherman, 1977; Pedro, Wolleatt, Fennema & Becker, 1981). Given the many difficulties inherent in predicting entry into professional careers, the selection of an intermediate criterion such as mathematics enrolment has a certain appeal even if the criterion itself has only a modest relationship with career entry. If that relationship is weak or negligible, however, the prediction of mathematics enrolment—while interesting and important in its own right—would be difficult to relate to the study of career perseverance. The fact that many women scientists had a background in high school mathematics (Sells, 1976) does not necessarily mean that mathematics enrolment is correlated with later career pursuits over the whole range of students.

The assumption that high school mathematics plays the critical role in science careers claimed for it by the investigators cited above appears to depend in their

view upon a demonstration of small sex-related differences in enrolments (cf. Fennema, 1977). Small differences in enrolments are not likely to be related to career selection unless there are qualitative differences in those enrolments. In general, evidence for the latter effect is limited.

Moreover, the evidence suggesting sex-related differences in enrolments is by no means clearcut. Fennema and her associates reported sex-related differences (Fennema, 1977; Fennema & Sherman, 1977; Konsin, 1976). On the other hand, Lantz and Smith (1980) reported no sex-related differences in intention to enroll or in actual enrolment in three separate samples. Differences that are reported are typically small and limited to the last year or so of high school (Fennema & Sherman, 1977).

In another recent study, Benbow and Stanley (1982) examined mathematics enrolments, achievement, and other variables for their participants in the Study of Mathematically Precocious Youth. They found that while there was differential mathematics course-taking in high school favoring the males, this could not explain the sex-related divergence in ability, appearing earlier and also favoring the males. For this reason, they found fault with the conclusion of Fennema and Sherman (1977) that sex differences in mathematical ability result from differential course-taking.

It could be argued that although males and females do not differ significantly in course enrolments, males achieve or retain more from such courses. However, studies such as that by Hyde (1981) show that gender differences on various assessments of cognitive performance were small and account for no more than 1% to 5% of the population variance, with some differences favoring males and some favoring females.

Re-examination of the Fennema-Sherman Study

Other grounds for questioning the Fennema and Sherman (1977) conclusions relative to the "critical filter" idea need to be examined. The small differences they reported occurred in their sample of four suburban Wisconsin high school districts. These authors noted that the rate of decline in mathematics enrolments through the high school grades, evident for both sexes, was faster for females than for males in these samples. They assumed that these differences are both significant and educationally important; i.e., related to well-documented sex-related differences in participation in science-related careers (Vetter, 1979). However, they did not report any statistical test to assure that the trend they noted is significant, and the overall sex differences were small (between 45 and 48 percent of those enrolled were female). Most of the difference between the sexes in enrolment was restricted to the senior year.

In view of the importance of sex differences in enrolments argued by these authors, two questions need to be answered: (1) Are these differences significant? (2) Are they large enough to support the assumption that enrolment differences provide a critical headstart for males? The first question merely addresses an omission in the previous research on this topic. The second goes on, however, to question whether differences are large enough in absolute magnitude to have the critical role these authors assume and if this assumption is well supported by the evidence they cite.

Method

In an attempt to answer these questions, an analysis of data reported by Fennema and Sherman (1977) was carried out.¹ The data on which Fennema et al. based their conclusions of significant sex differences are presented in their 1977 report (Fennema & Sherman, 1977, 56-57). This report gives summary statistics of enrolments in secondary mathematics in four suburban Wisconsin high school districts. These summary statistics were broken down by sex and grade level. In our analysis, a test of the degree of association between sex and grade in each of these four samples was done by means of point-biserial correlations.²

However, it is well known that significance levels of correlations, as of many other statistics, are affected by the size of the sample, such that with large sample sizes as those used by Fennema and Sherman, a correlation may be highly significant although small in absolute magnitude. In terms of the strength of relationship between the two variables, grade and sex, a more applicable method is to examine the squared correlation coefficient r^2 , representing the proportion of variance the two variables share in common. Therefore, squared correlations were also computed.

Results

Consistent with the report of Fennema and Sherman (1977), the correlations between sex and grade were significant. The rate of decline in enrolment from grades 9 through 12 was significantly faster for females than for males in all four schools. These results are summarized in Table 1.³ However, the correlations were small in absolute magnitude, ranging only as high as 0.14. The squared correlations ranged between approximately 0.002 and 0.02. These values are also shown in Table 1.

TABLE 1
POINT-BISERIAL CORRELATIONS BETWEEN SEX AND GRADE
IN TERMS OF MATHEMATICS ENROLMENTS IN FOUR SCHOOLS

School District	r p.b.	p	r^2 p.b.	Percent of Variance Not Accounted For
1	.14	<.005	.020	98
2	.10	<.0005	.010	99
3	.04	<.005	.002	99+
4	.09	<.0005	.009	99+

Note. Based on data published by Fennema and Sherman (1977).

Discussion

The results do not clearly support the implicit assumption of Fennema and Sherman (1977) that sex-related differences in enrolment decline have the import they attribute to them. Even though sex was significantly associated with enrolment decline, the sex-related difference in enrolment decline is extremely

small in absolute magnitude. In practical terms, the squared correlation coefficients reveal that there is practically no relationship whatsoever between sex and grade, i.e., most of the variance in college enrolments must be accounted for by other factors. (See Table 1.) Our computations correspond to the meta-analysis findings of Hyde (1981) in terms of the magnitude of sex differences, ranging from zero to two percent of total variance.

If males and females do not differ substantially in mathematics enrolments as a function of grade, it is a mistake to assume that this variable is necessarily critically related to postsecondary career pursuits. As a minimum, this analysis has cast doubt on the assumption that such a relationship exists. The data that Fennema and Sherman (1977) used to support the assumption now appear questionable in this regard. Thus, our re-examination agrees with Benbow and Stanley (1982) in challenging the purported critical role of high school mathematics course-taking.

The authors support efforts to understand and correct sex-related differences where they do occur, however slight they may be. We also agree with Fennema and Sherman (1977) that differences in participation must be controlled when comparing males and females on math-related abilities. However, the assumption that these differences are crucial to perseverance when they refer to traditionally male-dominated subjects, while understandable, is not necessarily borne out in this instance.

An Alternative Hypothesis

In the remainder of this paper, we would like to explore further a question that is left hanging at this point. If there is as yet no compelling evidence that secondary *enrolments* in mathematics play a critical role, how are the marked and extremely important sex-related differences in post-high school mathematics and science participation to be explained?

Our approach to this question is to apply certain ideas regarding meaningful versus rote learning and to relate these ideas to subsequent science-mathematics enrolments. Of course, the literature on career development is replete with other theories and relevant data regarding sex-related differences, but to review and assess these approaches is beyond the scope of this paper. Our recent review of the literature (Ridley & Novak, 1980) has suggested to us, however, that current approaches are almost totally lacking in an emphasis on the cumulative effects of *meaningful* learning experiences as one possible source of sex differences (discussed below). Therefore, we offer the following discussion of meaningful learning to complement current approaches and to suggest how the question posed above may be plausibly answered.

As stated earlier, the assumption that meaningful learning takes place automatically through instruction in high school mathematics classrooms and curricula appears to be implicit in the critical filter approach. We will argue, however, that meaningful learning occurs less often for females than for males. Females tend toward rote learning, which has been questioned increasingly as to its importance through a variety of theories emphasizing non-rote, or meaningful, learning (Anderson, Spiro & Montague, 1977; Ausubel, Novak & Hanesian, 1978; Bransford, 1979; Kintsch, 1974; and others). Although the critique of rote-learning approaches is a major piece of the puzzle, in our judgment it is the accumulation of meaningful learning experiences over time, within school environments, which is central here. The assimilation theory of David Ausubel is one which has dealt with

these matters quite systematically and thoroughly. We therefore turn to his theory for further insight; however, other theories emphasizing meaningful learning may yet be developed or elaborated to deal with these issues.

Ausubel (1968) and Ausubel et al. (1978) made the distinction between rote and meaningful learning wherein the latter involves non-arbitrary, relevant segments of the learner's existing cognitive structure. Meaningful learning requires (1) meaningful learning tasks (more or less present in all school learning), (2) relevant available concepts or propositions in the learner's cognitive structure (essentially always present in school-age learners), and (3) meaningful learning set (i.e., a deliberate set on the part of the learners to relate material substantively and non-arbitrarily to what they already know). The rote-meaningful distinction is not a dichotomy but rather a continuum. Since the extent of relevant cognitive structure available to assimilate a given segment of new knowledge varies from topic to topic and from learner to learner, and since the extent of meaningful learning set will also vary, individual learners may acquire a segment of new knowledge in a manner varying from near rote to highly meaningful (See Figure 1).

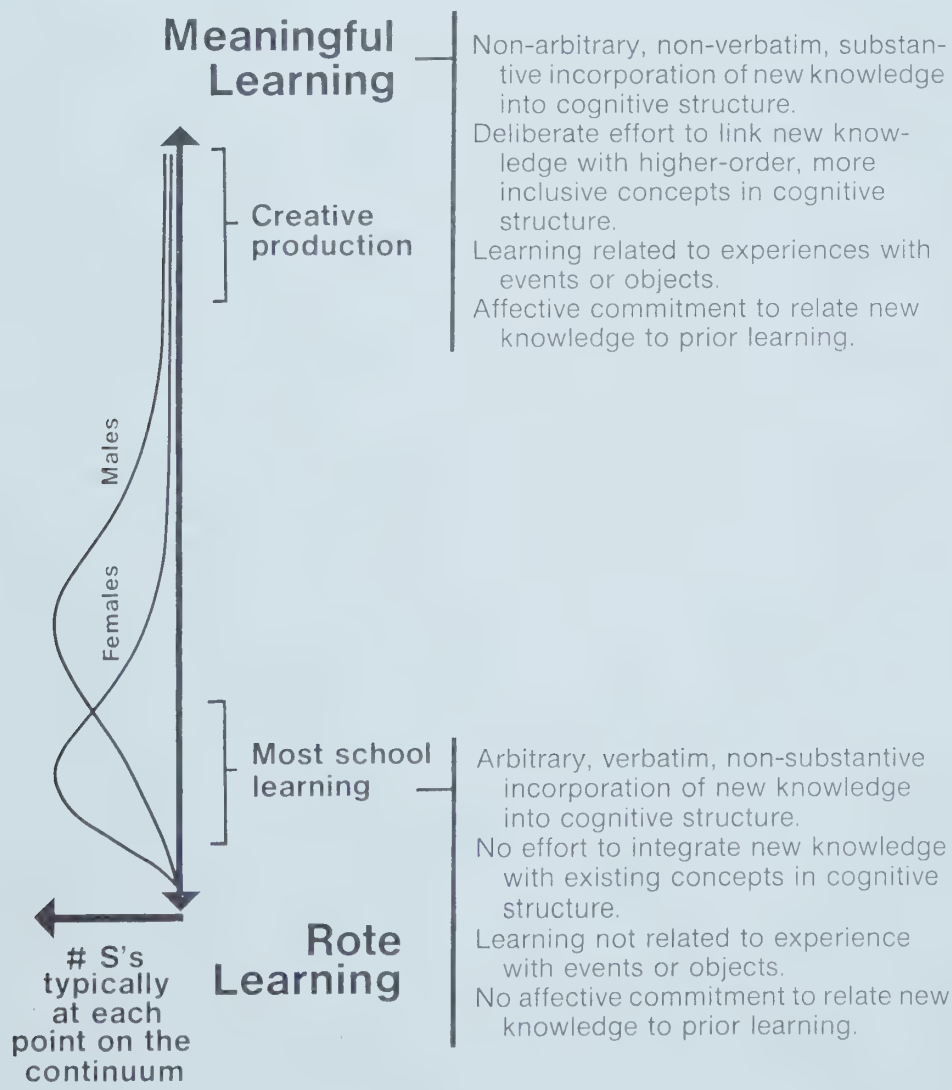


Figure 1. The Rote-meaningful learning continuum as represented in Ausubel's assimilation theory of cognitive learning. Hypothetical curves show differences between male and female populations in mode of learning (with differences exaggerated).

Most school learning procedures tend to stress and reward *verbatim* recall of knowledge of problem solutions. Socialization of females toward “doing what the teacher requires” is more accepted for females, whereas males are more often permitted (or even encouraged by their peers) to ignore or reject teacher expectations. One long-term result, we believe, is that females are more likely to adopt more rote-mode learning strategies than males (of course, with numerous exceptions) and hence to organize knowledge in cognitive structure in a less hierarchically integrated manner (see Novak, 1977, Chapter 8). Furthermore, socialization of children tends to favor relating new learning to real world experiences more for males than for females, the latter being less encouraged to “tinker” with science- or mathematics-related objects, thus adding to the arbitrariness of school learning for females. (See National Assessment of Educational Progress, 1979.)

We may reasonably assume that at lower levels of study in a discipline such as are found in high school, factors associated by Ausubel with rote-learning approach are more likely to predominate over factors which produce a meaningful learning approach. High school teachers may well be more likely than college instructors, for example, to reserve credit for answers which correspond in a verbatim fashion with whatever the learner has been taught (Novak, 1977). Students can perform satisfactorily in an essentially rote-learning mode when factors in the environment encourage rote-learning (Ausubel, 1977). However, at high levels of subject matter specialization, the failure to learn meaningfully is more likely to detract from assessed performance. Persistence in the discipline then depends on prior development of a disposition to learn meaningfully. This may account in part for some of the observed decline in senior mathematics classes by females.

Previous research done within an Ausubelian framework has supported the conclusion that prior concept learning in a specific subject matter area is the most important factor influencing learning (Ring & Novak, 1971; Tamir, 1968). Prior relevant concepts tend to organize and thus facilitate subsequent learning. Also small initial differences in prior relevant concepts can become enormous over years of schooling through the continuous effects of learning in either preparing or failing to prepare cognitive structures for new learning (Novak, 1977). Little evidence of these developing differences may appear when subject matter is presented with little attempt to relate concepts from topic to topic as is common in secondary school and some college courses. Typical instruction tends to compartmentalize learning into two- to four-week study units, with tests over this material requiring little more than recall of specific facts or application of stereotyped problem solving algorithms or rules. The integration of concepts into hierarchical frameworks of meaning spanning the whole course and/or linking with concepts in related courses or disciplines is rarely required at the secondary level. The consequence is that high achievement is possible or even favored with near rote-mode learning strategies with the resultant failure to produce more concept-integrative, meaningful learning strategies. The greater tendency of females to conform to expectations in such instructional practices will lead to progressively less capacity for building complex hierarchical meaning structures or less incentive to do so.

Sex-related differences could arise initially through such factors as greater exposure of males to science- and mathematics-related experiences prior to the first optional course in science or mathematics. Although initially small, any such difference in prior relevant experiences that embody key science or mathematics

concepts would have enormous effects later on through the "compound interest" effect of greater meaning conferred to prior relevant concepts (Novak, 1977). Our research at Cornell indicates that the most important concepts in terms of their later effects are those required at the beginning of a program of learning (Ring & Novak, 1971; Tamir, 1968). Therefore, sex-related differences in terms of meaningful learning of mathematics and/or science could develop over the grade school and high school years while having little effect on either enrolments or average levels of achievement at these levels. Such differences would nevertheless take their toll in terms of attitude toward the subject and willingness to persevere in it. Moreover, a nonmeaningful learning approach will be less successful in college level courses for the reasons given earlier.

The above theoretical account helps to explain why rates of enrolment and average levels of achievement do not necessarily differ markedly between the sexes during high school while enormous differences on related indices of participation (e.g., college enrolments) usually appear shortly thereafter. Lantz and Smith (1980) found that as long as mathematics is perceived to be useful, confidence in ability plays an important role in perseverance. Students of either sex can maintain sufficient confidence to stay with mathematics and science as long as formal learning opportunities require and stress only a relatively low level of understanding (i.e., limited integration of related concept meanings). Thus, enrolments probably indicate much less about long-term persistence than would a more accurate assessment of the tendency to acquire a broader level of understanding such as more advanced study requires.

Again, the above discussion should not be interpreted as minimizing the many other variables relevant to sex-related differences in career persistence; for example; differing sociocultural expectations other than those discussed above, same-sex role modeling, reinforcement for success in related endeavors, institutional barriers, etc. (Aiken, 1975; Fitzpatrick, 1976; Solmon, 1976). However, the compounding influence of previous learning that we wish to emphasize is as yet a largely unexplored aspect of career perseverance, and its absence in the current literature suggests that future research should incorporate an approach which makes the quality of learning and instruction itself more central.⁴

In view of this omission in the current literature, in particular studies directly testing the hypothesis advanced here, it is pertinent to consider briefly two ancillary studies bearing on the question of sex differences on variables related to meaningful learning. Although, again, they do not provide direct evidence for our hypothesis, they speak to the reasonableness of this type of approach as compared with exclusive reliance on the approaches more typically taken.

Two studies done at Cornell University dealt with factors influencing achievement in science and used sex as a variable. Atkin (1977) used an instructional strategy to encourage more meaningful learning of selected topics in organic chemistry. As with all of our studies, Atkin found that pretest scores for chemistry correlated significantly with course performance ($r=0.41$; $p<.01$; 59df), indicating the significance of relevant knowledge for subsequent learning in the subject area. Her evaluation of performance included more traditional questions requiring recall of specific information and also problem solving questions requiring application of concepts and principles in novel ways. Sex was not significantly correlated with posttest scores on factual recall items ($r=0.006$, $p>.05$; 59df) but was correlated with performance on posttest items dealing with novel problem

solving, with males performing better than females, particularly when instructions emphasized meaningful learning ($r=0.39$; $p<.05$; 29df).

Another study by Naegele (1974) was done in an introductory physics course utilizing a mastery learning approach (Bloom, 1968, 1976). Records were kept of the amount of study time required by students to pass each study unit at or above the criterion level. Learning efficiency values were computed for subjects, based on the average learning time required per study unit. The mastery learning approach permitted students to compensate for lack of prior knowledge; pretest knowledge in physics did not correlate with final performance ($r=-0.003$; $p>.05$; 699df). However, learning efficiency did correlate significantly with pretest score ($r=0.42$; $p<.01$; 55df) to the same extent as pretest knowledge and course performance in the Atkin study. Sex was also correlated significantly with learning efficiency ($r=0.42$; $p<.01$; 62df), indicating that males were more efficient in acquiring new knowledge. We believe this greater learning efficiency results from a greater tendency to use meaningful learning patterns that employ higher-order concepts and more deliberate integration of concepts and principles as indicated by interviews and indirect evidence in other research studies done by our group (see Novak, 1977, Chapter 8).

The differences indicated by these two studies, which account for some 18% of variance in performance, are several times the magnitude of sex-related differences in variance shown by science or mathematics course enrolment differences or differences in performance as measured by conventional achievement tests.

We believe that further research studies designed to assess the extent of high levels of meaningful learning will show sex differences favoring males and that longitudinal studies may indicate that this cognitive variable can account for much of the differential observed in male-female career choice and performance. Of course, many males may also be hampered by predominantly rote-learning patterns encouraged by school practices and thus we see eventual promise in new educational strategies for substantial improvement of education for both sexes. New strategies are being developed to encourage more meaningful educational practices (Novak & Gowin, 1982).

Notes

1. The authors gratefully acknowledge the advice and assistance given by Edward Kulick, Jason Millman and Miao-Hsiang Lin in the statistical analysis for this article.
2. Point-biserial correlations were used because the two variables, grade and age, are continuous and nominal variables, respectively.
3. A powerful test of the significance level for all four schools combined is possible using a method given in Darlington (1974) and other sources. However, this analysis would be superfluous given the highly significant results for each school separately.
4. Zuckerman (1977), a sociologist, has applied the notion of cumulative advantages to sex differences in science career achievements. However, her focus is almost exclusively on such facilitative factors as financial support, access to well-equipped laboratories, and close working relationships with established scientists. Again, the cumulative effects of meaningful learning experiences, or their lack, are not explicitly considered.

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PERSPECTIVES

The Performance-based/Developmental Debate About Student Teaching Supervision: A Typology and Tentative Resolution

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Supervisors of student teachers are typically confronted by two seemingly paradoxical concerns as they enter into the rigours and dynamic uncertainties of practicum supervision: one is a concern to aid student teachers in their personal and social development by reducing supervision-dependency needs through the mitigation of the threat factor inherent in the designation of the supervisor as the authority figure; the other is a here-and-now urgency to make the most productive use of the limited practicum time available through the cultivation of a business-like, task-oriented climate for supervision. These two concerns would also seem to characterize the major thrusts of student teaching supervision, the former towards an emphasis on the interpersonal helping relationship and the role of facilitator, the latter towards direct supervisory intervention as a form of task-oriented learning for student teachers. There appears then to be a tension between the claims of a performance-based direct approach to practicum supervision and the counter claims of a more inductive developmental process in which the supervisor's role is viewed as that of facilitator.

The thrust of this paper is to suggest that such a dichotomy is not only less than useful but likely fallacious. This suggestion rests on the premise that student teaching supervision may be regarded as a teaching process and, as such, represents a dynamic activity characterized by an urgent need to cope with and cater to the unexpected demands of an ambiguous and constantly changing environment. Such a context, it seems to us, precludes the luxury of adopting a bifurcated view of practicum supervision, i.e., direct versus indirect, in favour of a more

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interdependent view, namely one that calls for supervisor variability of approach and flexibility in interactive behaviours.

In the paper, there will therefore be an attempt to develop a typology of approaches available to supervisors caught up in the performance based/developmental debate. It will also contain a proposal for a balanced approach to supervision as a tentative resolution of the conflicting interpretations of the process. Such a typology and tentative resolution cannot, however, be described without first examining the context that surrounds student teaching practicum supervision.

The Performance-Based/Developmental Debate

Performance-based teacher education (PBTE) and its bed-fellow, competency-based teacher education (CBTE), have exerted considerable influence on student teaching supervision over the last fifteen years. Indeed, between August 1967 and January 1973 the American federal government spent over \$12 million on performance-based teacher education projects (Hamilton, 1973, p. 13), evidence of the recent trend towards conceptualizing the teaching process in terms of the competencies required in instructional performance to effect learning in students (Cooper & Weber, 1973). This trend essentially had its origins in the public disenchantment with teacher education programmes that found expression in Conant's (1963) analysis and Koerner's (1963) scathing criticism. Teacher complaints about the usefulness of their preparation for classroom practice (see Holt, 1964; Kohl, 1967) only exacerbated the situation.

Concomitant with this was the emerging demand that teachers be held accountable for student achievement. Teachers, in turn, rejoined that they were inadequately prepared for such a demand, since they lacked the skills and strategies necessary for ensuring that quality learning in students would inevitably take place as a result of instruction. Hence the performance-based teacher education movement was born so as to provide "training in which the prospective or inservice teacher acquires, to a prespecified degree, performance tendencies and capabilities that promote student achievement of educational objectives" (Gage & Winne, 1975, 146-147). The selection and definition of performance tendencies and capabilities is carried out in relation to the effects that such competencies are deemed to have on student achievement gains in terms of knowledge, skills and attitudes (Elam, 1971).

Performance-based teacher education (PBTE) draws its philosophical underpinnings from behavioural psychology and its application to training in industrial and military settings:

In such training, the repertoire of skills to be achieved was analyzed systematically to specify less complex behavioral components and their interrelationships. Training usually began with verbal instruction in the behavioral components, then proceeded with practice in performing the skills to be learned, and the practice was followed by corrective feedback. Additional cycles of instruction, practice and feedback would be provided as needed. The individual components were integrated so as to approximate more and more closely the complete repertoire. (Gage & Winne, 1975, 148-149)

This training strategy initially entered the field of education in the form of programmed instruction. During the 1960s, it was adapted to teacher preparation programmes in the form of micro-teaching (Allen & Ryan, 1969; Borg, 1972, Berliner, 1969). Teaching strategies were defined and categorized in terms of

discrete skills and preservice teachers were then expected to experiment with each of these skills in a shortened lesson period containing a reduced number of students. Many variations along this theme are found today in PBTE preparation programmes.

The PBTE approach contrasts considerably then with the conventional approach to teacher education—a combination of university courses in foundations and curriculum and instruction methods with a mandatory practicum where the supervisory function is shared by a sponsor teacher and a faculty advisor. The more conventional approach assumes that:

If the student teacher is exposed to what purports to be effective teaching, the osmosis process automatically will enable him to absorb from the supervising teacher an approach or style that is effective. At the same time, it is assumed that the process automatically filters out any approach or style that is not effective. (Oestreich, 1974, pp. 335-337)

Since, however, student teaching supervision and its effects on preservice teachers are largely unexamined by the participants, the assumptions of the conventional approach are controvertible in every case except where the supervisor (sponsor teacher and/or faculty advisor) is demonstrably an outstanding teacher. Indeed, Peck and Tucker (1973, p. 967) conclude that “at least by the end of student teaching, there are some almost universally reported decrements in attitude and teacher behavior, as compared with the starting position of students prior to their field experience.”

The case for PBTE is therefore a strong one, but one which is also subject to much criticism. Working alongside the university-based teacher education programme is the hidden yet powerful socialization process that bombards student teachers in the schools themselves. Getzels (1963, pp. 310-312) postulates one possible explanation of this covert “teacher education programme,” contending that schools are social organizations with institutional roles and expectations, i.e., the nomothetic dimension, that act as powerful socializing forces on preservice and beginning teachers. A study by Horowitz (1968), who found that schools could change student teacher attitudes in as little as two weeks, provides empirical support for this theoretical position. As a consequence, many critics (e.g., Rubin, 1979; Smith, 1975) question the claim that PBTE programmes can effect positive changes in teacher behaviour, skill and attitude, since the lack of a school-based component does not allow student teachers to acquire skills in the very arena where such socialization occurs.

Such criticism is, however, based on experiential and pragmatic grounds. A more serious criticism emanates from a difference in philosophical underpinnings. Human developmentalists (Bents & Howey, 1981; Birch, 1969b; Combs, 1972; Dewey, 1938; Glassberg & Oja, 1981; Glassberg & Sprinthall, 1980; Kohlberg & Mayer, 1972; Loevinger, 1976; Nemser, 1980; Piaget, 1970; Sprinthall & Mosher, 1978; Witherell, 1977; and Zumwalt, 1982) would suggest that PBTE can be deleterious in its effects on teachers and students alike. Combs (1972, pp. 286-290) outlines the critical features of a teacher education programme viewed from this perspective: (a) effective teacher education is highly personal and dependent on the prospective teacher’s development of an appropriate system of beliefs; (b) educating effective teachers is a process of promoting the “becoming” of a teacher, rather than one of educating a person in how to teach; (c) “becoming” an effective teacher has its origins in security and acceptance; (d) teacher education should emphasize meanings rather than behaviours; and (e) teacher education should focus more on the teacher’s subjective impressions and less on objectively gathered information

about the processes and effects of teaching. Developmentalists therefore argue that student teachers' classroom functioning is essentially determined by the complexity of their conceptual structure, i.e., the schema employed to make sense of the teaching experience. Conceptual complexity is seen, then, to act as an internal mediating cognitive process, varying according to the stage of each person's development, that governs the student teacher's classroom behaviour and actions. Teacher education is based on a developmental approach where the preparation programme provides for a balance between action and reflection as it attempts to foster human growth. Glassberg and Sprinthall (1980, p. 35) maintain that "student teaching presents a clear opportunity for learning by both doing and reflecting through classroom experience and a weekly supervision seminar."

The developmental approach is based on the ideas of Dewey (1938) and, to a lesser extent, Piaget (1970) and Kohlberg (1968) who claim that an emotionally engaging experience must be followed by reflective analysis if qualitative changes in growth and development are to occur. Developmentalists emphasize the role of the environment in creating disequilibrium, but caution that too much disequilibrium or dissonance can become overwhelming for the student teacher (Birch, 1969a), resulting in the arrestation of growth at the stage of development already attained and the cessation of progress towards higher levels of conceptual complexity. Teacher preparation programmes following this perspective generally emphasize role-taking, reflection, and support.

Glassberg and Sprinthall (1980), Glassberg and Oja (1981), and Bents and Howey (1981) all describe the major features of a developmental approach to teacher education. Essentially, developmental teacher education programmes involve participants in role-taking experiences, attempt to match the student teacher's developmental level with appropriate degrees of structure in the educational environment, allow for careful and continuous guided reflection, aim at establishing a balance between real experience and discussion/reflection, ensure programmatic continuity over a long period of time, and provide personal support and challenge for each of the programme participants.

Role-taking experiences, as distinct from role-playing (Mead, 1934), are activities grounded in everyday reality. They are, by definition, direct and active rather than vicarious and indirect. Student teachers are encouraged to tackle new, more complex interpersonal tasks than previously undertaken, the assumption being that the adoption of a different perspective, frequently that of another person, stimulates both cognitive and affective development. Glassberg and Sprinthall (1980) report on how they developed a curriculum containing a sequence of role-taking experiences designed specifically to teach student teachers to (1) observe and analyse their own teaching, and (2) supervise each other.

The "matching" of appropriate structure to the supervisee's developmental level is the essential theme of Glickman's (1981) approach to instructional supervision. Supervisees capable of functioning at higher levels of abstract thought often prefer less structured environments because they are then free to exercise initiative and responsibility, whereas less developmentally mature individuals frequently cannot cope with such situations and need highly structured environments.

Careful and continuous guided reflection of role-taking experiences in light of theoretical constructs and conceptual frameworks enables student teachers to examine their learning from a variety of perspectives. Such exploratory behaviour

generally leads to a deep internalization of theory in a manner that influences classroom practice.

Establishing a balance between real experience and discussion/reflection, together with *programmatic continuity* over a long period of time is seen as providing for student teacher progress to higher stages of development. Throughout the entire process, *the provision of personal support and challenge* for each of the programme participants is deemed to be essential. Challenge usually comes through the role-taking experiences and the structured environment which creates cognitive dissonance in student teachers. Such dissonance, however, can be devastating without necessary psychological support.

The developmental approach to teacher education is rooted in preparation programmes that combine action and reflection, doing and thoughtful analysis. The performance-based teacher education (PBTE) approach, on the other hand, emphasizes the training for and application of predetermined teaching behaviours and skills in a manner that systematically adds to and improves a student teacher's repertoire. Recent evidence of the reality of the performance-based/developmental debate is to be found in the October 1982 issue of *Educational Leadership*. Thematically entitled "The Coaching of Teaching," the issue highlights articles (Joyce & Showers; Berliner & Brandt; Mohlman, Kierstead, & Gundlach; Fonzi; and Evans) that lend credence to the PBTE premise that

All skills are broken down into discrete steps. We work on each segment, then combine them into whole skills . . . then go back and work on the specifics of skills that are giving problems The necessity of overlearning skills to the point of automaticity if they are to be useful in a more complex setting is reflected in . . . (a) training regimen. (Joyce & Showers, 1982, pp. 8, 10)

Indeed, *Educational Leadership's* Executive Editor, Ron Brandt, noting that David Berliner sees coaching as the only way to get substantial classroom change, states in the "Overview" that "coaching seems to be the most powerful way for some teachers to learn complex new practices" (Brandt, 1982, p. 3).

A close look at the other articles that address the issue of improving teaching and staff development (McCarthy; Wood, McQuarrie & Thompson; Thompson & Wood; Wilsey & Killion), however, indicates a strong leaning towards the developmental perspective where the authors are concerned to frame inservice teacher education around models that provide for differing stages of human growth. Indeed, the intensity of the critique and response dialogue between Fonzi and Thompson/Wood over "effective staff development practices" may be best understood in terms of a conflict of the performance-based perspective with a developmentalist approach. At no point do the contending authors appear to find common ground and, in the end, they remain entrenched in their respective positions:

We believe even more strongly in the potential of experiential learning to change and improve the quality of educational programs, but we welcome critics who would enter into dialogue about the efficacy of staff development and school improvement techniques. We would ask, however, that such dialogue or criticism suggest alternatives for improving staff development and not serve as a rationale for retreat from promising staff development practices, or continued use of outmoded and ineffective approaches to inservice education. (Thompson & Wood, 1982, p. 35)

The almost vitriolic sting contained in the last sentence of the above quotation is, for us, unfortunate. It does, however, demonstrate the need for a description of

the various approaches to supervision that fall under the respective rubrics of performance-based and developmental and for the articulation of a perspective that could provide a tentative resolution to the Fonzi-Thompson/Wood impasse.

A Typology of Approaches to Student Teaching Supervision

In attempting to analyze what constitutes effective teaching, the supervisor “must know which of his observations . . . on teaching have research support, which are drawn from experience or practice and which are assumptions, value judgments or prejudices about what and how children should be taught” (Mosher & Purpel, 1972, p. 35). Close examination of how each of these two broad approaches (the performance-based and developmental student teaching supervision) utilizes knowledge derived from research on teaching reveals a further classification: performance-based (direct) approaches can be categorized as ideological or technological while developmental (facilitative) approaches can be described as operating in an indulgent or deliberative mode. No approach is without its problems when exercised exclusively.

Performance-Based (Direct) Approaches

Student-teaching supervisors who are acutely aware of the time constraints in the school-based experience often, in the name of efficiency, gravitate toward a performance-based or direct style of supervision. Rather than see student teachers grapple with the problems encountered in teaching, such supervisors pragmatically provide instructions about what to do and when to do it. The assumption is that the student’s chances of success will thereby be enhanced and that the limited time available will be used more productively.

Figure 1 illustrates varying levels of utilization of “effective teaching” knowledge. The dimension of knowledge utilization provides, then, a point of discrimination between the ideological and technological modes of performance-based (direct) supervision. Direct supervision may be regarded as ideological when the supervisor strongly espouses and communicates positions on classroom teaching which are grounded more in personal values and experience than in knowledge derived from recent research. Where such positions emanate from research on teaching findings, however, direct supervision is deemed to have a technological orientation.

The ideological mode. Supervisors acting in the ideological mode tend to proceed directly and impose their strong views about teaching on student teachers. Although student teachers may be in a position to learn some very valuable teaching techniques, the supervisors’ shortcomings will become apparent when they are called upon to justify the procedures advocated, and can do so only on experiential grounds and/or value positions. The supervisors will be unable to enter into a meaningful discussion of alternate procedures and, therefore, little opportunity will be provided for the student teachers to practise making informed choices concerning procedures, materials and ways of responding to children. The supervisor’s personal teaching behaviour thus becomes a somewhat constraining model. Although potentially capable of generating a teaching style distinct from that of the supervisor, the student teacher is unlikely to do so while adhering closely to experientially-based directives issued by the supervisor.

The technological mode. Time-wary supervisors, who also command and utilize a sound knowledge of research on teaching, tend to adopt what Zumwalt (1982) has

termed a “technological orientation” in which teaching is regarded “as being composed of a definable repertoire of knowledge, skills and attitudes that a teacher brings to bear in an effort to create certain changes in learners” (Zumwalt, 1982, pp. 223, 224). Supervisors acting in this mode see their role as one of socializing preservice teachers to use on a regular basis the knowledge, skills and attitudes that research has demonstrated to be effective in leading to pupil learning gains. Accordingly, an approach so geared towards the modification of student teacher behaviour makes the specification of goals of central importance (Bandura, 1969). The behaviours, skills and attitudes which are still undeveloped in student teachers, though necessary to successful teaching, provide specific performance goals which serve as guidelines for supervisors and student teachers jointly engaged in a field experience. Once the behaviours or skills to be acquired have been identified, the students continue with practice sessions interspersed with evaluative feedback until those skills or behaviours are added to their repertoire and can be tested in a practical setting. Ultimately, this mode concentrates upon student teacher attainment of necessary classroom performance goals.

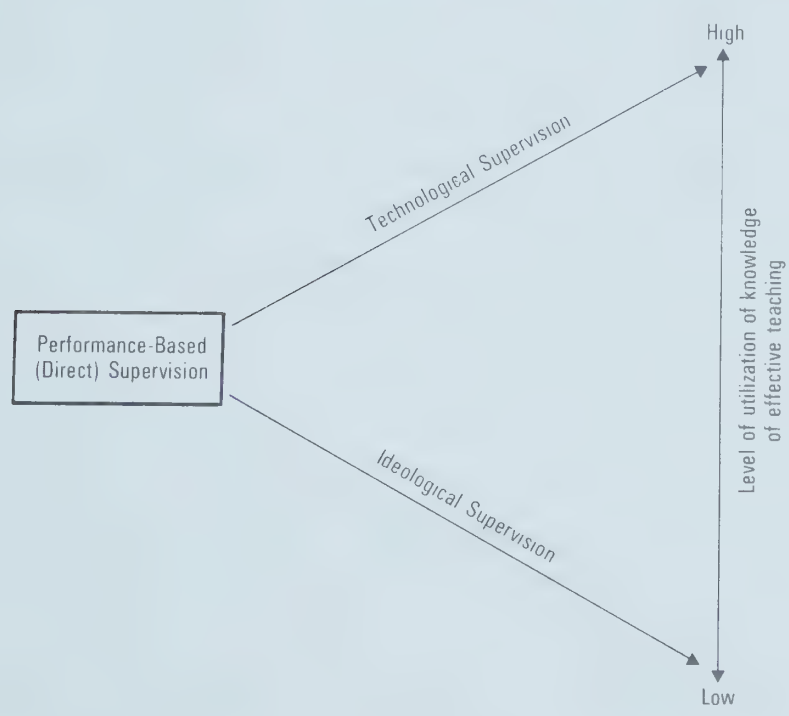


Figure 1: Performance-based (direct) supervision and knowledge utilization.

Developmental (Facilitative) Approaches

Whereas performance-based supervision has roots in the supervisor’s realization that time is short, developmental supervision may become the favored mode when a supervisor is trying to minimize the threatening aspects of the field experience for

the student teacher. The supervisor assumes a facilitative function, concentrating on the quality of relationship developed with the student and the creation of a supportive working environment in which professional growth may occur. Learning to teach is treated as a developmental process, one in which the student is encouraged to create his or her own unique style of teaching while working through the problems which emerge as the field-experience proceeds.

Joyce (1975, p. 134) elaborates on the process, noting that in preparing a teacher,

one must help him develop first, an adequate self; second, reliable ways of perceiving others and their goals, and third, the ability to learn substance when it is needed. To prepare such teachers, we must provide a helping relationship for the teacher candidate just as he must provide one for his students.

The absence of threat in the helping relationship provided for the student teacher is regarded as essential, for threat adversely affects perception in a way which would be detrimental to the learning taking place in a field-experience (Combs, 1971, p. 375). Threat narrows the perceptual field, producing tunnel vision, a condition in which a threatened person may fail to take into account the many variables that are present in a complex teaching-learning situation. Further, threat often gives rise to defensive behaviour with the result that an individual may cling to already held views, thus reducing the likelihood of perceptual change and associated new learnings.

Figure 2 demonstrates how the dimension of knowledge utilization allows for discrimination between two distinct modes of developmental (facilitative) supervision.

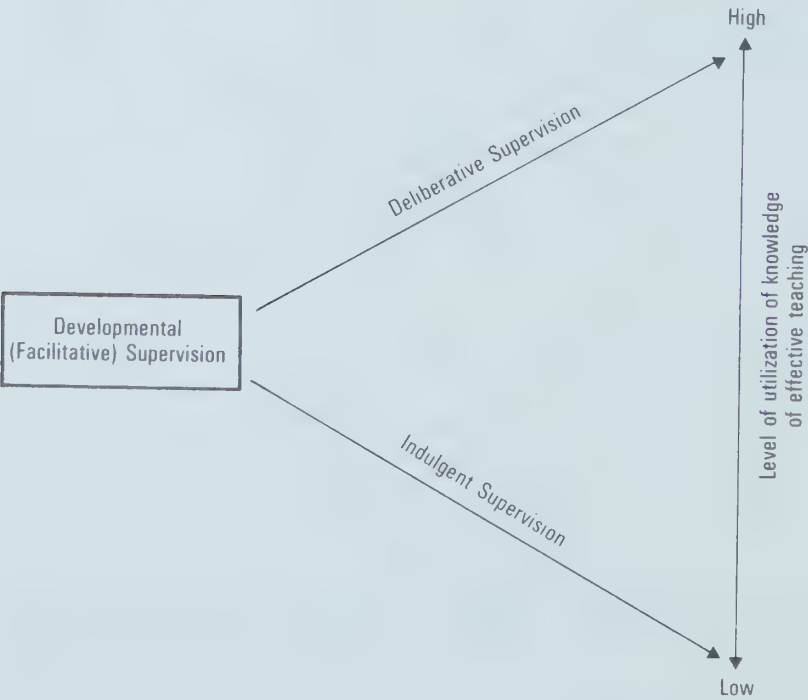


Figure 2: Developmental (facilitative) supervision and knowledge utilization.

The effort to provide a relatively nurturant and threat-free learning environment for student teachers varies according to the degree to which supervisors are able to utilize sound knowledge of effective teaching. Developmental (facilitative) supervision that is rarely grounded in substantive research knowledge can be described as indulgent while the utilization of such knowledge tends to foster a deliberative mode of operation.

The indulgent mode. In attempting to minimize threat, supervisors may entirely avoid stating expectations or making performance demands. If supervisors do not have an extensive understanding of what constitutes effective teaching, supervisory assistance may be limited to providing encouragement and the opportunity to learn by trial and error. Although they appreciate the empathic, sensitive, counselling aspects of a helping relationship, many student teachers nevertheless expect and request very practical help (Nias, 1977, p. 124) in matters such as understanding children, organizing learning experiences, locating materials and equipment, foreseeing trouble spots, and even mounting and displaying work. Indulgent supervision leaves such students floundering—unable to solve their problems and paired with supervisors who appear to be of little assistance. In such circumstances, one can foresee the possibility of deteriorating relationships.

The deliberative mode. Supervisors who command a body of knowledge concerning teaching effectiveness, are able to provide student teachers with the opportunity to discuss alternative strategies for achieving desired outcomes in pupils—outcomes contingent upon learner characteristics and the nature of the classroom environment. The mode of operation, characterized by Zumwalt (1982) as “deliberative,” regards teaching more as a clinical process of “aggregating and making sense out of an incredible diversity of information sources” (N.I.E., 1974, p. 3) that pertain to the demands of the classroom teaching-learning situation. The emphasis in this mode is on providing teachers with ways to think about and deliberate upon their classroom experiences in light of recent research on teaching. Zumwalt (1982, p. 237) posits that “the reality of teaching demands an approach to teacher education that accommodates the complexity of teaching, the similarities and uniqueness of individuals and contexts, the knowledge base and the judgmental aspects of the teaching process.” Student teachers who experience deliberative supervision are challenged to acquire a knowledge of research on teaching, to develop a critical orientation towards it, and to test it in practical situations. In doing so, they become better prepared to evaluate the curricular and methodological trends which are likely to emerge as their teaching careers unfold. Zumwalt (1982, p. 225) encapsulates the essence of this mode in her statement that “to improve education, . . . one educates teachers in a way that enhances their deliberations about teaching.” Without the capacity to be self-critical, a teacher can scarcely be considered professional.

Problems Associated with the Different Approaches

The exclusive application of any one approach to the supervision of student teaching may give rise to a variety of potential problems. The thrust of this paper is to suggest that more serious problems are likely to arise where supervisors largely ignore the growing body of knowledge pertaining to effective classroom teaching. That is not to say, however, that supervision in the technological or deliberative modes is without problem; rather, we see supervisor utilization of research findings as providing a more desirable and, to the student, acceptable base upon which both parties can tackle the inevitable problems that accompany practicum supervision.

Problems in the ideological mode. The issuing of directives about classroom teaching that are based largely on experience or value positions tends to elevate the supervisor, albeit somewhat inadvertently, to the position of sole teaching model. Just as the socialization of children is accomplished through their modeling or imitating the behaviour of significant others (Bandura & Waters, 1963), so the student teacher may elect to model the supervisor's teaching behaviour or elements thereof. A variety of rewards may be anticipated, not least of which would be the supervisor's approval and accompanying favorable evaluation, prerequisites to certification and employment. Alternately, students may imitate the supervisor's teaching behaviour in order to attain results similar to those achieved by the supervisor, particularly in the area of pupil understanding and cooperation; on the other hand, however, their modeling may represent a calculated attempt to "survive." The survival perspective has been identified as one which quickly replaces the initial, idealized friendly confidant's orientation, which characterizes most student teachers prior to their initial field experience (Fuller & Brown, 1975; Gibson, 1976). As the student teacher, on the basis of regular feedback, attempts to model the teaching behaviour of the supervisor more and more closely, the question of the adequacy of the model is one which becomes a central concern for teacher educators.

Problems in the indulgent mode. The use of developmental (facilitative) supervision without the "embracing arc of research on teaching . . . making the participants profoundly influenced by and unequivocally dependent upon the empirical knowledge derived from its enterprise" (Grimmett, 1981, pp. 29, 31), tends to reduce supervision to "a tea party" (Goldhammer, 1969, p. 61) where student teachers perceive the supervisor as not caring enough about classroom instruction to make suggestions and criticisms. In short, this non-directive, relatively passive approach, where "orthodox Rogerians are often misguided gamesters" (Goldhammer, 1969, p. 32), often results in a low level of productivity, interpersonal relations, and morale that characterizes an impoverished, rudderless approach to student teaching supervision.

Problems in the technological mode. The first and possibly most serious problem in this approach relates to the fact that a successful teaching performance is more than a package of achieved performance goals; that is, conceivably a student teacher might meet all of the specified performance objectives, yet fail to be able to combine them in a fashion exemplifying effective teaching. The selective reinforcement of effective components of teaching may be regarded as an approach which is too piecemeal to necessarily account for a unified teaching performance (McDonald, 1977, p. 30). Secondly, student teachers who have mastered certain performance objectives may find that the pupils or sponsor teacher or both in the classroom to which they are assigned are unaccustomed to and unreceptive towards the techniques. As Copeland (1979) relates, the "ecological system," the routines and customary teaching patterns of a particular classroom, is a significant variable in determining success for the student teacher. Thirdly, if student teachers are merely required to demonstrate skills chosen by others, they are deprived of the opportunity to create, discover and hypothesize, all of which are essential behaviours in a professional teacher (Zumwalt, 1982, p. 249). This may be the most serious limitation of the technological mode of performance-based (direct) supervision.

Problems in the deliberative mode. One of the major shortcomings of this approach lies in the fact that not everyone required to supervise student teachers

has the necessary degree of sensitivity and the required communication skills to function optimally in a supervisory mode in which student teachers are considered to be discovering their own personal teaching styles. Many supervisors are confronted with the dilemma of how to handle what they see as avoidable errors in classroom teaching, particularly sponsor teachers who inevitably must consider the effects of the student teacher's errors on the pupils. If pupils lose valuable learning time or feel threatened or confused through the student's experimentation, the sponsor teacher's responsibility to intervene on their behalf takes on greater significance. A second problem for the deliberative supervisor arises in the dual nature of the supervisory expectations that the student teachers hold. On one hand, they expect "detailed guidance on how to teach" (Nias, 1977, p. 125) and on the other, warm sensitive counseling. If their expectations of practical help are not met, students may be left floundering and soon lose confidence in their supervisors and in themselves. Such difficulties are likely to be exacerbated by a supervisory orientation towards indirect procedures. The limited background knowledge of teaching and learning, which characterizes many students, creates a third problem for the deliberative supervisor. Students may not be aware of many of the alternative courses of action available to them as they confront instructional problems. This then reinforces the Storey and Housego (1981) notion that the intervention of a second party assists teachers in identifying instructional needs and alternatives. Such a notion would suggest the need for periodic direction and focusing on the part of student teacher supervisors.

The dimension of knowledge utilization enables us to draw an important distinction: that the technological and deliberative modes are more informed and therefore more useful and acceptable to student teachers than the ideological and the indulgent. The problems associated with the preferred modes are accentuated, however, by any tendency to favour one to the exclusion of the other. Such a proclivity to the technological or the deliberative can only be reduced by a tentative resolution of the current debate.

A Tentative Resolution

Figure 3 provides a summary of the discussion thus far. Student teaching supervisors' choice of approach is determined by which of the two concerns (time and threat) is of greater importance and by the degree to which research-verified knowledge about classroom instruction is utilized in intervening with preservice teachers. In addition, Figure 3 also provides the base upon which a tentative resolution of the current performance-based/developmental debate can be proposed. The tendency of any debate is to produce polarity. It would seem to us, however, that there is a need for a perspective that allows for a balanced concern for both the time and threat factors and fosters a high propensity for the utilization of research-derived knowledge of teaching. Such a perspective would inevitably hold definite implications for teacher education programmes and research.

Consequences of Polarity

Figure 4 contains a demonstration of the consequences of polarity. Supervisors become entrenched in either the performance-based (direct) approach or the developmental (facilitative) approach. Where such an entrenched position makes little or no reference to research knowledge of effective teaching, the approach to student teaching supervision is likely to take on an impoverished character.

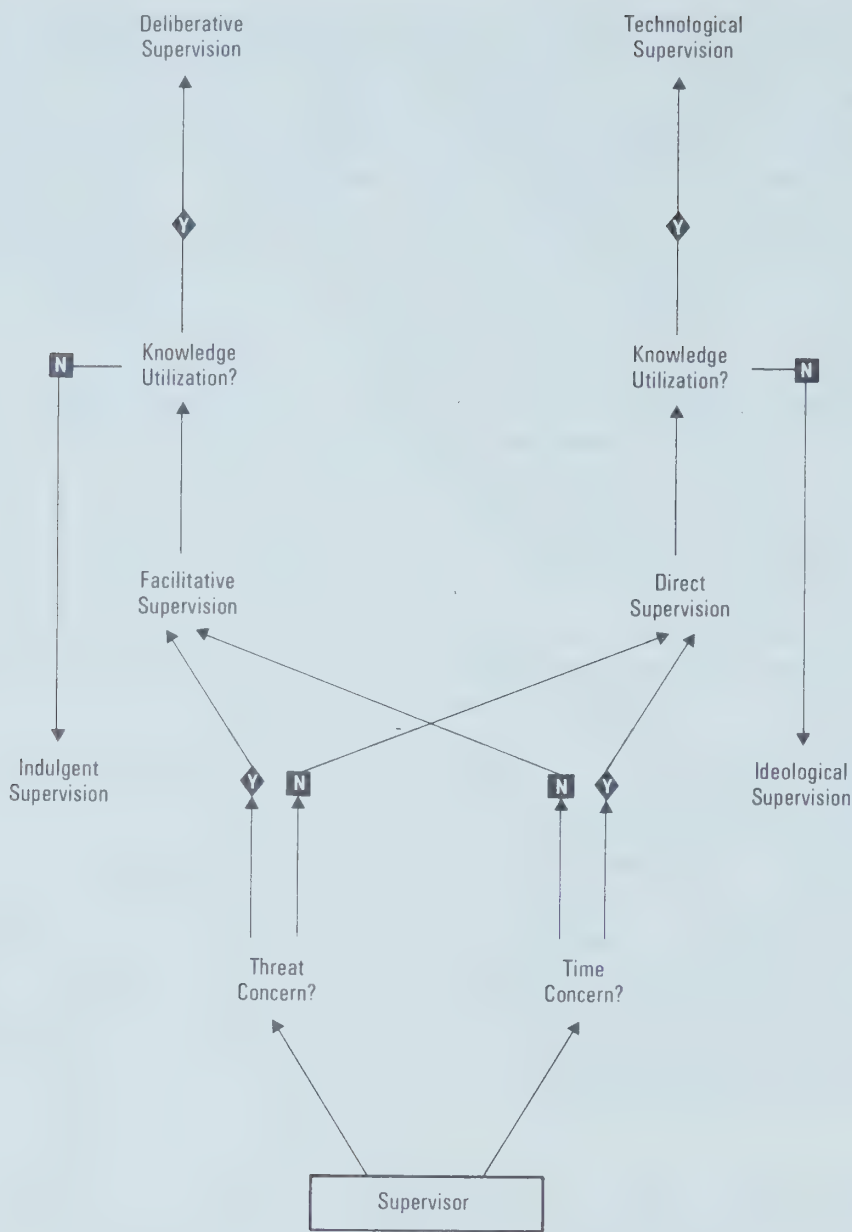


Figure 3: A typology of student-teaching supervision approaches.

An entrenched ideological or indulgent position. The possible dilemma posed by supervisors adopting an entrenched position, i.e., they tend towards either a direct approach or a facilitative one, is that they may address only one of the two major concerns that confront them in the reality of the practicum. Such restricted vision could be found to have deleterious effects on student teachers. The research of Thies-Sprinthall (1980) would suggest that where a less developmentally mature student is placed with a Rogerian-type supervisor, or where an independently minded student is paired with a directive supervisor, the potential for the practicum to become a miseducative process is high. Much has been written about the need for matching student teachers with similarly focused supervisors (see Brodbelt, 1980; Easterly, 1978; Kilgore, 1979; Lang, Cornish & Trew, 1980; McIntyre & Morris, 1980). An examination of the practicum time frame used in

many teacher education programmes, particularly that of “the distributed practicum,” would suggest, however, that matching *per se* is not the complete answer; rather, there appears to be need for supervisors to become less entrenched and to display greater flexibility in addressing both the concern for productive use of available time and the concern for the removal of threat and student dependency. Where such flexibility is not evident and research knowledge is not tapped, an entrenched position first becomes ideological or indulgent and ultimately impoverished.

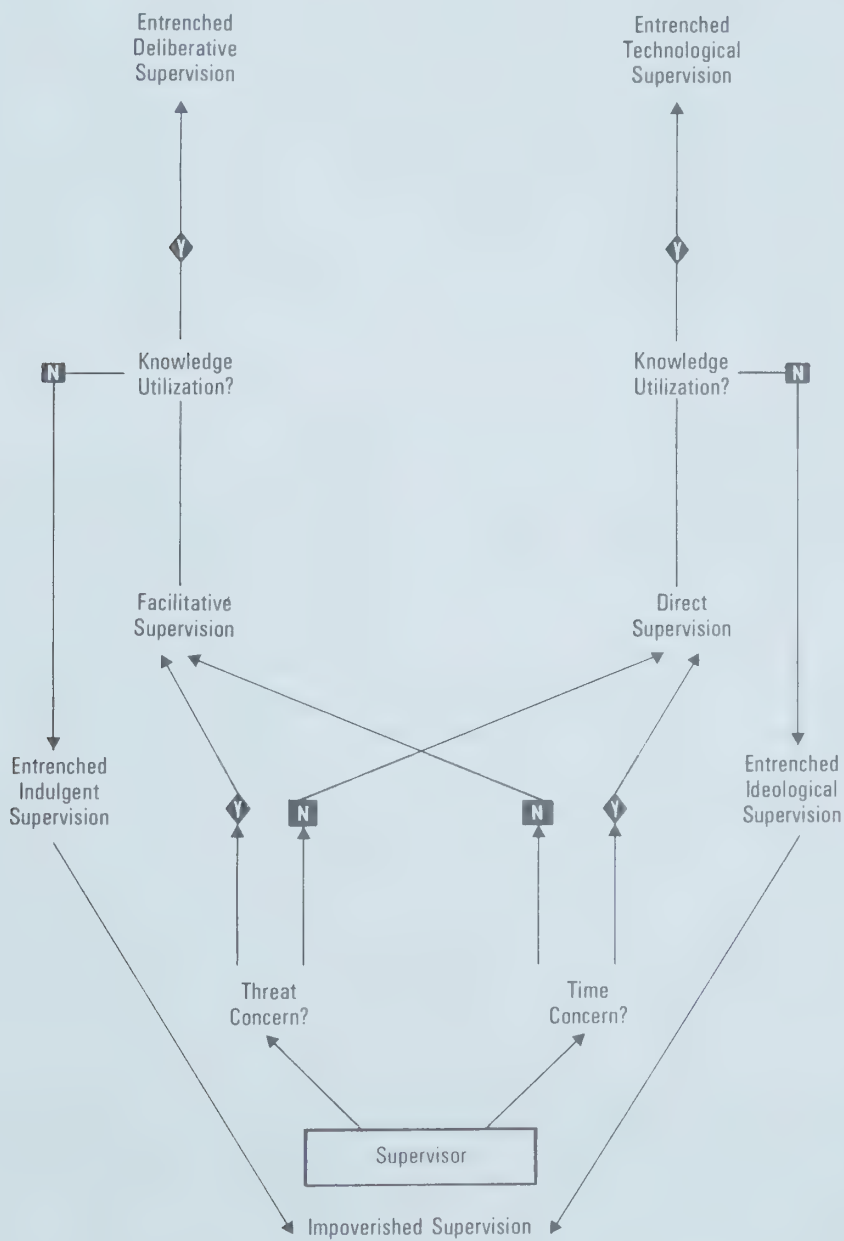


Figure 4: A typology of approaches and the outcomes of polarity.

An impoverished approach. This approach results in supervisors addressing neither the threat factor nor the concern for productive use of practicum time. Because their view of student teaching supervision is restricted to one side of the debate and to their own personal biases and values within that framework, supervisors fail to communicate an earnestness about the student teachers' classroom performance or their development as would-be professionals. As a consequence, supervisors are perceived as not caring about the student teachers, the pupils, the instruction, or the process of supervision in itself; rather their actions appear to be determined by self-interest and self-defence. Supervisory influence is therefore minimal.

Polarization between the performance-based (direct) and the developmental (facilitative) approaches inevitably leads to an entrenched position which, if research knowledge on teaching is not utilized, tends to degenerate, over time, into an impoverished approach. The use of substantive, technical knowledge by supervisors would seem to forestall the adoption of an impoverished approach by moving them away from the ideological and indulgent towards the technological and deliberative modes. But knowledge utilization in and of itself will not prevent polarity and entrenchment; what is required is an overarching perspective that provides for utilization of knowledge and the addressing of the dual concerns of time and threat.

A Suggested Answer: A Metadeliberative Perspective

The metadeliberative perspective provides a supraordinate conceptual framework that allows student teaching supervisors to take the dual concerns of time and threat into account. Figure 5 demonstrates how the technological and deliberative modes assume a metadeliberative perspective as supervisors become aware of the need to incorporate the other broad orientation and concern into their approach to practicum supervision. In other words, technological supervisors would seek to go beyond the mere imparting and practice of research-based knowledge and skills in a manner that trains prospective teachers for the classroom by providing them with opportunities to engage in role-taking, risk-taking activities that prompt guided reflection in light of the research findings that have been utilized. Similarly, deliberative supervisors would not merely be content with providing a research-embracing facilitative approach; rather, they would see the need to supplement student teacher reflective decision-making about classroom teaching with clear presentation, demonstration and opportunities for practice with feedback of specific instructional behaviours and skills. Research knowledge on teaching enables the supervisor then to engage the student in setting meaningful performance goals to which the preservice teacher can progress through sequenced practice and evaluation. The same research knowledge of teaching effectiveness may also enhance the working relationship between the student teacher and supervisor as they collaboratively attempt to recognize the complex, multifaceted nature of the task the student is aspiring to perform.

The metadeliberative perspective consequently encourages student teaching supervisors constantly to make choices at a meta level concerning the complex practicum mosaic composed of pupil learning needs, instructional performance needs, and supervisor-teacher relationship needs. At times, the emphasis may be more towards the needs of pupil learning and instructional performance, at others on the nurturing of confidence and professional autonomy in the preservice teacher.

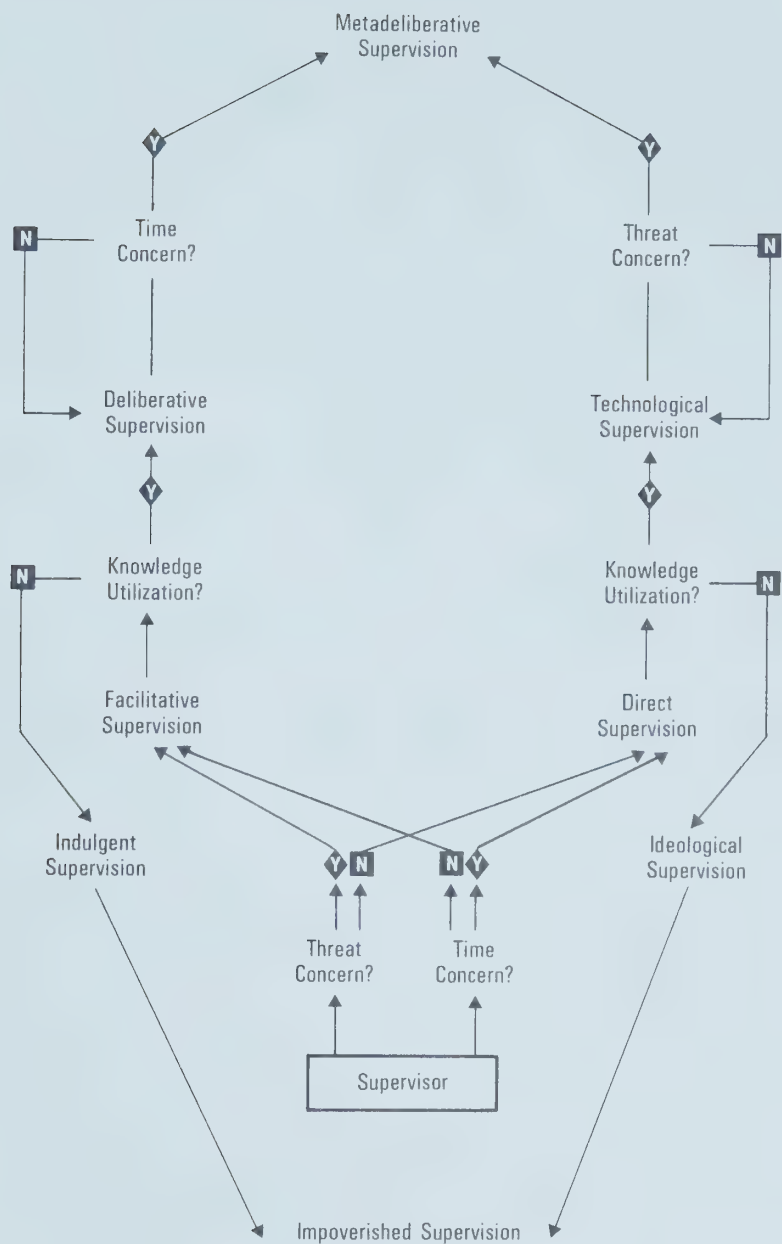


Figure 5: A typology of approaches and the metadeliberative perspective on supervision.

Throughout the process of practicum supervision, supervisors espousing the metadeliberative perspective constantly deliberate not on which research verified instructional skills to have preservice teachers practice (essentially the technological mode), nor on which research knowledge to share in order that student teacher understanding of classroom teaching be enlightened (essentially the deliberative mode), but rather on which of the two supervisory modes most appropriately meets the apparent and pressing needs of the specific practicum context and situation in which they must supervise at any given time. As such, the metadeliberative perspective fosters a continuous monitoring of the variables and needs that impinge on practicum supervision in order that the appropriate variability of approach associated with supervisor flexibility becomes possible. This tightrope-like

functioning on the part of student teaching supervisors would seem to us to epitomize the healthy tension that creatively energizes any learning experience. More significantly, it safeguards student teaching supervision from becoming entrenched in either the performance-based, technological orientation, or the developmental, deliberative approach. Such a perspective would appear then to hold certain implications for teacher education.

Implications of the Metadeliberative Perspective

The implementation of a metadeliberative perspective in student teaching supervision would hold specific implications for teacher and supervisor preparation programmes and for research on teacher education.

Teacher education preparation programmes. It would appear from the literature that teacher education programmes tend either towards a performance-based emphasis or a developmental approach. On the basis of the discussion pertaining to the metadeliberative perspective, there would appear to be a need to redirect the tendency of teacher and supervisor preparation programmes away from a restrictive focus on one conception or the other towards a more eclectic emphasis that draws on the strengths of both approaches. For teacher preparation programmes this would mean designing a curriculum that caters to the need for specific behaviours and skill acquisition and also provides for student teachers to stretch their thinking about what goes on in classrooms. For supervisor preparation programmes the curriculum would be designed to immerse would-be supervisors in recent research on teaching in a manner where they can learn to deliberate on practicum situations so as to utilize such knowledge along technological and/or deliberative lines according to the specific variables operative at the time.

Research on teacher education. The discussion of the metadeliberative perspective is an attempt to articulate a tentative, conceptual resolution to the performance-based/developmental debate. There is a need, however, to test the feasibility of such a perspective in the crucible of empirical practice. Specifically, there is a need to know more about the impinging factors of time and threat as they affect practicum supervision; we need to understand whether the controlled absence of one factor, e.g., an experimental study comparing student teaching supervision during a ten-month internship with a three-week practicum, would point to the fostering of one mode (in the case of our example, the deliberative) over the other or whether, as we would argue, there is always a need in student teaching supervision for a thoughtful blending of both the technological and the deliberative. Our position would be that it is difficult to imagine practicum situations in which the productive use of time and the mitigation of supervisor threat are not pervasive concerns. Consequently, we see the need for research studies to explore these aspects of practicum supervision with a view to verifying or confuting the need for a metadeliberative perspective.

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BOOK REVIEWS

UNTERSUCHUNGEN ZUM MATHEMATIKUNTERRICHT (STUDIES IN MATHEMATICAL EDUCATION) SERIES. *Edited by the Institute for the Didactics of Mathematics, University of Bielefeld, West Germany.* Vol. 1: FRAGEN DES GEOMETRIEUNTERRICHTS; Vol. 2: PERSPEKTIVEN FÜR DIE AUSBILDUNG DES MATHEMATIKLEHRERS; Vol. 3: FORSCHUNG IN DER MATHEMATIKDIDAKTIK. Cologne, West Germany: Aulis Verlag Deubner & Co., 1981, 236, 308, and 276 pp.

The purpose of this new publication series as described in each of its first three volumes is to inform about the work of the Institute for the Didactics of Mathematics (IDM), a supraregional central institute for research, development, and co-ordination in mathematical education established at the University of Bielefeld, West Germany. The work of IDM is characterized by the importance attached to the interaction between theory and practice. The teacher is indeed undervalued when research is supposed not to be interesting or meaningful to him; research is likewise undervalued when it is held to be powerless and without implications for practice.

The most important work of IDM is published in the series "Untersuchungen zum Mathematikunterricht" (Studies in Mathematical Education). Two other series, respectively entitled "Schriftenreihe" (Monograph Series) and "Materialien und Studien" (Materials and Studies), are more in the nature of reports on the research done at IDM. In addition, there is a series entitled "Occasional Papers."

The first volume in the series under review is edited by H. G. Steiner and B. Winkelmann and entitled *Fragen des Geometrieunterrichts* (Problems of Geometry Teaching). It contains several papers originally presented to a conference on geometry organized by IDM and ICMI in 1974 as well as several papers delivered at a conference on curriculum change during the past twenty years and which was convened by IDM and IEA in 1980. Papers included in the volume are as follows: "Geometrie im Mathematikunterricht: Eine Analyse neuerer Entwicklungen" (Geometry in Mathematical Education: An Analysis of Recent Developments) (H. J. Vollrath); "Zur Veränderung geometrischer Begriffssysteme durch die Reform der Lehrmittel" (Towards a Change in Geometrical Conceptual Systems by means of a Reform of Instructional Media) (P. Damerov); "Ein umfassender und moderner Geometrieunterricht" (Comprehensive and Modern Geometry Teaching) (W. Servais); "Geometrie in der Grundschule" (Geometry in the Primary School) (H. Freudenthal); "Neuer Geometrie-Unterricht auf der Sekundarstufe" (New Geometry Teaching at the Secondary School Level) (G. Schoemaker, A. Goodijn, J. de Lange, and M. Kindt); "Die Inzidenzgeometrie im Dienste einer progressiven und polykonkreten Pädagogik" (Incidental Geometry

at the Service of a Progressive and Polyconcrete Pedagogics) (G. Glaeser); “Visuelle Mathematik” (Visual Mathematics) (A. J. Bishop); “Geometrisches Verständnis und die Lösung von Problemen” (Geometrical Understanding and the Solving of Problems) (T. J. Fletcher); “Die Bedeutung der Darstellenden Geometrie für die Mathematikausbildung” (The Significance of Representational Geometry for Mathematical Education) (G. Pickert); “Aktuelle Probleme des Geometrieunterrichts aus der Sicht der Bielefelder Geometrietagung” (Present-Day Problems in Geometry Teaching as seen from the Perspective of the Bielefeld Conference on Geometry) (H. G. Steiner and B. Winkelmann).

In these papers the emphasis is on the pedagogical and psychological aspects of the problems considered, rather than on mathematical content. The research trends promoted by Thom (ICMI Conference, Exeter, 1972) and by Freudenthal may be seen to be reflected in them. Also, new developments in mathematics, as well as practical applications and problem-oriented geometry, come in for treatment. The interest here is more in the process of building up geometric concepts and in the practical value of the latter than in a formal, structural approach to geometry. Connections with space also come to the fore.

The second volume in the series is edited by the IDM working group on the Education of Mathematics Teachers—consisting of fourteen members—and entitled *Perspektiven für die Ausbildung des Mathematiklehrers* (Perspectives on the Education of Mathematics Teachers). It is based on the work of a conference devoted to “Trends and Problems in the Education of Mathematics Teachers” and organized by IDM in 1975.

The first chapter, “Probleme der Unterrichtsreform” (Problems relating to Educational Reform), deals with research on educational innovation, with special reference to the reform of mathematics as a school subject in the Federal Republic of Germany. Innovation processes are studied here as teacher education is, rightly, regarded as a means of innovation.

The second chapter, which is given over to “Neue Formen und Modelle der Lehrerbildung” (New Forms and Models of Teacher Education), discusses teacher effectiveness, the problem of the relation between theoretical knowledge and practical experience, and methods used in teacher education, such as group-dynamic experiences, observation, microteaching, protocol materials, training in teacher models, competency-based teacher education, and inservice training.

The third chapter probes more deeply into the problem of the relation between theory and practice.

The fourth chapter, devoted to “Mathematiklehrerbildung und die Natur des Wissens” (The Education of Mathematics Teachers and the Nature of Knowledge), is the most substantial part of the book, dealing as it does with the influence of mathematics as a science on mathematics as a school subject, the structure of the latter discipline, the relation between concept formation and mathematical proof, and, finally, knowledge and metaknowledge.

The volume concludes with a summary and a comprehensive bibliography.

The third volume in the series, edited by H. Bauersfeld, H. W. Heymann, and J. H. Lorenz, and which is concerned with *Forschung in der Mathematikdidaktik* (Research on the Didactics of Mathematics), derives from a conference organized by IDM in 1977 and which had as its theme “Methods of Research on Teaching in the field of the Didactics of Mathematics: Working Examples, Present-Day Problems, and Future Strategies.” The book, which consists of seventeen papers by

as many different authors, is articulated around five topics: teacher-pupil interaction; pupil-oriented research; the teacher and research in education; and methodology and content in research on the didactics of mathematics.

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EVALUATING THE QUALITY OF LEARNING. THE SOLO TAXONOMY (STRUCTURE OF THE OBSERVED LEARNING OUTCOME). *By J.B. Biggs and K.F. Collis.* London: Academic Press Inc., 1982, 245 pp.

The authors of this volume emphasize the importance of being able to identify quality in learning and in essence the book outlines their search for this rather elusive entity. Their major objective was to develop "a criterion referenced measure of the quality of learning" (p. 8). In order to accomplish this task they proceeded to analyze the organization of responses to academic questions by numerous students from all levels of the educational spectrum. They conclude that the basis of quality learning can be found in structural organization which allows one to discriminate well learned material from poorly learned material in a manner parallel to the way one distinguishes immature thought from mature thought. This structural organization which they label SOLO (Structure of Observed Learning Outcomes) forms the basis for a taxonomy which the authors believe can be used to evaluate the quality of learning in varying subjects and at varying educational levels.

The book is divided into four parts. Part I describes the general structure of the Taxonomy. Part II deals with the application of the Taxonomy to various subject areas (including reading, poetry and creative writing). Part III discusses the implications of the Taxonomy for educational practice. Part IV speculates on the ramifications of the taxonomy in educational and psychological theory. Parts I through III are designed for the practitioner; Part IV is designed for the theoretician.

Parts I and IV were of particular interest to this reviewer. In Part I the authors discuss the nature of instruction and the subsequent evaluation of learning. Three models of evaluation are reviewed: those of Bloom, Engelhart, Furst, Hill and Krathwohl (1956), Schroder, Driver and Struefert (1967), and Marton and Saljo (1976). The merits of each framework are highlighted, and particular attention is paid to their attempts to identify increasing levels of structural complexity. The authors observe that their orientation tends to vary from the others in that they believe that there are "natural stages in the growth of learning any complex material or skill and that in certain respects these stages are similar to, but not identical with, the developmental stages in thinking described by Piaget and his co-workers" (p. 15).

The basic structure of the SOLO taxonomy is delineated in chapter two. The authors describe the interrelationship between learning and development and develop their rationale for a relationship between developmental stages and learning quality. In brief, a person's developmental stage might determine the upper limit of functioning, but other factors such as motivation, etc. might result in

one not performing to that particular level. The need to distinguish between learning and development meant that the authors had to develop different terminology to distinguish levels of learning quality from cognitive levels (Piagetian Stages). Therefore the SOLO levels of “prestructural, unistructural, multistructural, relational and extended abstract are isomorphic to, but logically distinct from the stages of preoperational, early concrete, middle concrete, concrete generalization and formal operational, respectively” (p. 31).

Two major concerns are addressed in Part IV—those of a methodological nature (issues of reliability and validity) and those of a theoretical nature, that is the relationship of SOLO to other models of learning and development.

Generally the authors conclude that they are encouraged by the analysis they have conducted regarding reliability and validity of the SOLO taxonomy, and state that “several studies, involving the rating of history items, poetry and creative writing” have given rise to correlations between independent raters ranging from .71 to .95. In regards to validity, they note that several approaches have been utilized, including agreement with teacher ratings of quality, factor analytic studies and process analysis, and in general they are satisfied with the results of their preliminary work in this area.

The final chapter concentrates on the issues and implications that SOLO raises for psychological theory in general and for Piagetian theory in particular.

The strength of this work lies in its general applicability to the field of education. The authors have bridged the gap between theory and practice and have produced a valuable piece of work of use to both teachers in the field and to academics. Educators can readily adapt the taxonomy to fit their particular content area and academics have “food for thought” in terms of the relationships posited between psychological development and learning outcomes.

In sum this book proved to be an interesting, practical, and thought-provoking piece of work which lived up to the authors’ promise to be of value to both practitioner and theoretician.

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PREPARATION OF MANUSCRIPTS

1. All manuscripts must be typewritten, double spaced, and submitted in duplicate. An abstract of approximately 100 words in length, typed on a separate page, should be provided.
2. Tables must be numbered in Arabic numerals with the word 'Table' centered and in capital letters, e.g., TABLE 4. The heading of the table is to be centered below and typed in capitals. The format of tables should conform to the specifications in the APA Publications Manual.
3. Graphs and charts should be used only if essential. They must be carefully prepared on separate sheets in India ink, ready for reproduction. Graphs must be properly labelled using Arabic numerals, e.g., Figure 3.
4. Each table or figure should be presented on a separate page. The position of tables and graphs should be clearly indicated within the text by inserting at the relevant point the phrase (Insert Table 2 here).
5. References should appear in parentheses following the reference citing the author's name (unless the name appears in the text), the year of publication, and page number if appropriate. For direct quotations, the reference should be cited and the page number given in brackets before the final punctuation of the quotation. The references should be listed alphabetically by authors' last names at the end of the manuscript under the heading, *References*.
6. Explanatory notes, numbered consecutively and identified in the text with a superscript, may be included under the heading of *Notes*. They should be double spaced and placed at the end of the manuscript immediately preceding the *References*. The citing of references and quotations in the *Notes* should conform to the procedures outlined in No. 5 above.
7. Spelling shall conform to the *Oxford English Dictionary* or to the *Dictionary of Canadian English*, except in the case of direct quotations which must conform to the original. Editorial alterations will be made if necessary.
8. In matters of style, the APA Publications Manual is considered definitive.

